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AUTHOR Harries, Thomas E.; And Others
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ABSTRACT

This manual presents a self-instructional program designed to acquaint educators with general systems theory as it applies to instructional development practices and the diffusion of instructional innovations. It is also intended to provide an intellectual and emotional frame of reference for individuals undertaking instructional development activities and to present a checklist of criteria and/or operations related to systematic instructional development. The manual was originally developed as part of the materials for participants at the Instructional Development Institute, but it was also designed for use by school personnel who did not attend the institute. The manual is organized in three sections that correspond to the three stages of the instructional development model--(1) identifying the problem, (2) analyzing the setting, and (3) organizing management. Short summary "guideposts" are interspersed throughout the program, and frequent references are made to the variety of supplemental and exemplary materials contained in the appendix. (JG)

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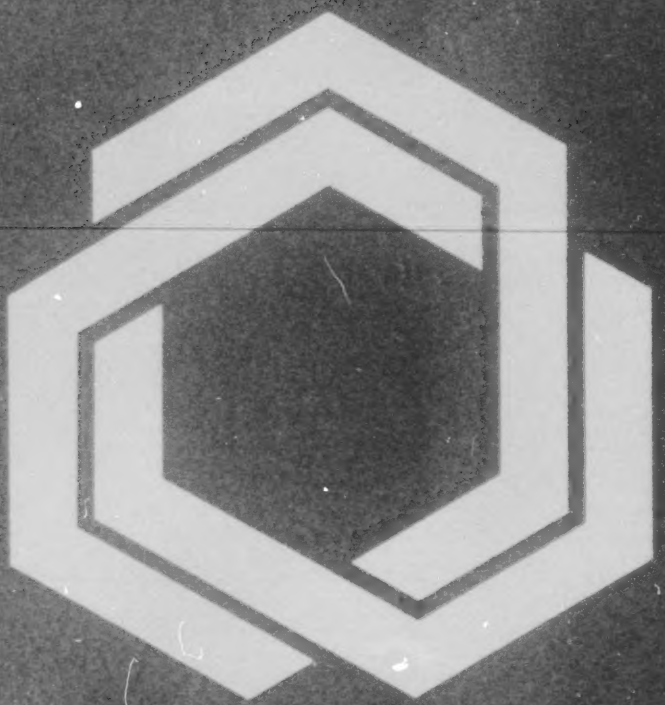

National Special Media Institutes

APPLICATION OF GENERAL SYSTEMS THEORY TO INSTRUCTIONAL DEVELOPMENT

Instructional Development Institute

2

The Application of GENERAL SYSTEMS THEORY TO Instructional Development:

A Self — Instructional Program

Prepared for the
National Special Media Institute

by

Thomas E. Harries

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INTRODUCTION

PURPOSES OF THE MANUAL

The purposes of this manual are:

1. To use some of the **methods** that are a by-product of our technology as a means of improving and facilitating human communication within our schools, so that they can be more responsibe to the human needs of the people they serve.

2. To provide preparation and **guidance** for those participants who will have responsibilities as referees during the Innovation Interaction Game, which will be played during Stage I (DEFINE) of the Institute.

General Systems Theory as a Method

In the past a technical methodology, such as general systems theory, has often been applied to **things**; to materialistic considerations. The areas of computer technology, mathematical topology, probability theory, thermodynamics, cybernetics, and so forth, have been largely directed at mechanistic endeavors such as getting a man on the moon. Little attention has been paid to strictly human considerations.

Recently, however, general systems theory has been looked at with increasing interest by social scientists as a **tool** for understanding human behavior and for increasing the ability of individuals to work creatively and productively with one another. This systems approach to instructional development is a by-product of that interest and has pursued because of its significant potential for meeting certain urgent needs now prevalent in most of our schools.

Ideally, this analytical system of instructional development will facilitate the identification of problem areas within the school, serve as a catalyst in improving school community relations, provide guidance for the evolution of imaginative and relevant curriculums, direct students along efficient paths toward their own self-actualization and self-realization; and in the process, strengthen the human bonds of friendship among the different publics of the school professional; the student, his family, and the community citizen. Although the **potential** of the systems approach is truly remarkable, it remains only a **methodology**, not a cure-all! The key to its potential lies not in itself, but in the people who will manage it. It is a blind servant which has served only technology until recently. It will be your task to become acquainted with general systems theory and direct it in the service of **people**.

The Manual as a Guide

The first stage of the three-stage model is called **Define**. During that portion of the model you will learn the activities which are attendant to (1) Identifying the Problem, (2) Analyzing the Setting, and (3) Organizing Management. To facilitate learning about these activities, the participants will play a game designed to make visible some of the considerations applicable in Stage I. The referees must be familiar with general systems theory as it applies to instructional development to be able to referee the games in a creative, confident, and effective manner. Most important, the referees will remain as **key resource people** in considerations attendant to the first stage of the model after the institute has concluded its activities and the school system undertakes to conduct a serious program of instructional development. And finally, this program of self-instruction can be used by other individuals within the school system who did not participate as referees, or who were not in attendance at the Institute, as a means of becoming familiar with the important concepts of the theory.* To clarify what is expected of individuals who wish to work through this sequence of self-instruction, certain goals and objectives have been identified.

Goals of the Manual

1. To acquaint you with General Systems Theory (GST) a new, important and useful body of knowledge as it is applied to instructional development practices and to **diffusion** of instructional innovations.

2. To provide you with a checklist of criteria and/or operations which will enable you to actually undertake systematic instructional development. (The lists and criteria are all contained in the Appendices. They are based upon the first three steps of the instructional development model: identify the problem, analyze the setting, and organize management.) The function of the program is to **present and defend the logical necessity** of the systems approach as revealed by this phase of the Special Media Institute.

3. To provide you with an intellectual and emotional **frame of reference** so that you will feel comfortable in either:

   a. Undertaking instructional development activities yourself, or

   b. Supporting and helping others who wish to undertake activities themselves.

*A limited number of copies of this self-instructional program will be made available to the school system upon the conclusion of the Institute.

Organization of the Manual

1. There are three parts to the program, each of which is preceded by a statement of objectives.

   a. Identify the problem.

   b. Analyze the setting.

   c. Organize management.

2. There is a list of appendices, each of which bears upon some specific part of the above three steps, the use for which is either explained or becomes apparent as you work through the program.

3. "Guideposts" or short summary narratives are interspersed throughout the program to assist you in:

   a. Summarizing what you have just completed.

   b. Previewing what is coming next.

   c. Providing continuity.

   d. Expediting a later review of the program should you wish to do so.

How to Use the Program

1. Relate what you are doing in the program to the **past**!

   How does the program information relate to your recent professional experiences? Is it revealing anything about "hidden rules" in some of the interpersonal dynamics you have experienced?

2. Relate the program to the **future**!

   a. Later in the institute, you will see a slide tape presentation concerning an instructional development project which is actually being undertaken by the Norwalk-La Mirada Unified School District near Los Angeles. What things will you look for during this experience?

   b. Knowing what you do about your own professional responsibilities, what applications and implications do you find emerging as you gather the information contained in the program?

   c. If you are a referee, what applications will you anticipate in the Innovation Interaction Game?

3. Read **all** parts of the program including the elaboration of the answers, even if your answer agrees with the given answer. There may be **new** information contained in the answer.

4. You may find unfamiliar terms or familiar terms used in new contexts, remember that the jargon is the **means** to **the end** of becoming **acquainted** with systems concepts. **You are not expected to retain the jargon** unless you wish to pursue the theory in detail or assume a major responsibility as a systems developer.

5. If your answer disagrees with the answer given, try to understand why the given answer is more appropriate. Since you are not expected to master or even learn GST, your answers which are reasonably equivalent or similar are acceptable in meeting the program's goals. The goal states: "Become acquainted!"

6. The program will be most helpful to you if you commit yourself by writing the responses. The program will not be as effective nor helpful if you only read it over.

7. The behavioral objectives which are found preceding each section will tell you what level of performance is expected in order to make good the goals of the program.

8. You can work more comfortably by covering up the answer(s) below the frame while you are reading the frame. Asterisks, *****, are provided just above the answer so that you can quickly reveal the frame without accidentally exposing the frame's answer which lies immediately below the asterisk line.

PROGRAMMED SEQUENCE

PART I—FUNCTION 1: IDENTIFY THE PROBLEM

Objectives

1. You will be able to recognize and identify in the context of an instructional setting the following phenomena:

   a. **Suprasystem** – the total environment such as an entire school district or **community** in which the **system of interest*** is embedded.

   b. **System** – the collection of integrated entities which have arbitrarily been designated as of **central interest**, such as a school.

   c. **Subsystem** – a smaller collection of entities which comprise a **portion** of the system of central interest (i.e. teachers, students, physical facilities, etc.).

      NOTE: It is "legal" to interchange these words since they are **relatively** (rather than absolutely) defined. That is, when you are talking about the community as the system of interest, the school becomes a subsystem, etc.

   d. **Entropy** – disorder, confusion, randomness, unpredictability.

   e. **Information** – input of sensory data to a system which **creates order**, reduces uncertainty, and makes predictable (the opposite of entropy).

   f. **Interface** – the **boundary** between systems (or subsystems) which has the option of accepting or rejecting information.

   g. **Closed system** – a system which rejects or is **unable to accept information** input from an external system.

   h. **Open system** – a system which accepts the input of information from external systems.

   i. **System dissonance** – a dysfunctional, disturbing, malevolent, inefficient, inadequate or unsatisfactory feature or phenomenon of a system which renders it less functional or more inefficient than it could be.

*(UNDERLINED WORDS ARE IMPORTANT AS BUILDING BLOCKS TOWARD MEETING THE PROGRAM'S GOALS.)

j. **Problem** – the subsystem or entity (or collection) thereof which generates systems dissonance.

k. **Symptom** – the overt events or visible evidence of a problem (systems dissonance).

l. **Image** – a person's total concept and view of **his** world. The sum total of the perceptual ability, knowledge and life's experience.

m. **Ideal** – a collection of separate images which have become congruent or identical enough to permit harmonious (non-dissonant) interaction among the systems (persons) who represent the respective images. (Note: instructional development will depend upon the fusion of separate images into an ideal.)

2. You will begin using **analytical descriptors** such as appropriate-inappropriate, functional-dysfunctional, harmonious-dissonant (or entropic), efficient-inefficient **instead of** emotionally loaded value judgment such as good-bad, right-wrong and pass-fail.

3. Given a specific example, you should analyze the events using the above concepts to reach appropriate conclusions based upon the information provided.

Criteria:

1. You should obtain +75% similar responses in order to have made good the goals set for the program.

2. You should strive for +90% similar responses if you wish to begin mastering the theory or becoming a systems-developer.

Guidepost #1

A characteristic of any system is its **all-at-onceness.** In order to understand the nine-step model presented in this Institute, you must see the model in its all-at-onceness. Do not let the fact that it must be presented in a **linear** sequence mislead you. You do **not** thoroughly define the problem and then jump entirely into analysis of the setting. You do **both together**, and while you're doing that you are organizing management and anticipating possible objectives and means of evaluation. You do it all at once! Progressing through the model really amounts to a **shading of emphasis!** You begin with emphasis on problem definition and end with recycling, but you anticipate and recycle throughout the process.

Your first task in identifying problems is to divide up your instructional world into systems. There is only one criterion for making the decision to include or exclude some

entity as a part of a system. That is . . . is it convenient, useful, helpful, or efficient. If it is, do it. If not, divide your instructional world up some other way.

The first part of the program will give you practice in identifying useful systems. Then you will develop some nomenclature and skills in labeling the systems and their dynamics. By this means, you will find it easier to **separate symptoms from problems** and pin down the dysfunctional sources of systems dissonance (problem).

1. An important advantage of a systems approach is its flexibility. You can arrange and rearrange the environment any way you want which is consistent with the school's purpose. **Systems are relative**; there is no such thing as **the** system. Any given system is chosen for its relative advantages, for which you must pay the price of certain accompanying disadvantages. Your first task is to define the total system of interest into manageable units. Study and prepare to recall the following definitions:

   a. **System** – that **arbitrarily** designated complex of individuals, immediate communication network and accompanying physical facilities which appear to be of major interest in locating and defining a given instructional problem.

   b. **Suprasystem** – that **larger** system of which the system at issue is a part (embedded in). Analysis of the system of interest must take into account that system's relationship to its suprasystem as well as each of its subsystems.

   c. **Subsystem** – a subcomponent or **smaller part** of the system at interest which can be isolated for convenience of analysis. Any analysis of a system which must account for a definition of relevant subsystems and their interaction with each other.

   d. **Interface** – a designated **boundary** between systems or between subsystems, between subsystems and suprasystems and so forth. It may be physical such as a teller's window, or a telephone link; but for most instructional development analysis, the interface will be a **person** who links and thus provides for **information transfer** between systems (or subsystems).

A system is (absolutely defined, relatively defined)? (Identify the appropriate answer.)

* *

2. **Relatively defined** means:

   a. There can be only one **perfect** system for a given purpose if you could just define what it should be.

   b. There is no such thing as the perfect system, only an optimum trade off in terms of pros and cons.

* *

b

3. In definition of the problem, your first task will be to:

   a. Propose a solution to the apparent problem.

   b. Assign blame or fault (sometimes politely called "responsibility").

   c. Define the instructional setting into systems and subsystems.

* *

c

4. A University wishes to systematically analyze its Department of Instructional Development. Using the labels **suprasystem** and **subsystem**, classify the following parts of the system:

   a. Podunk University _____
   b. Department of ID System under analysis
   c. Testing Unit _____
   d. Production Unit _____

* *

a. Suprasystem
b. Subsystem
c. Subsystem

5. A school system wishes to **evaluate** its physical education program. One of your tasks as an instructional development specialist is to define which **subsystems** of the suprasystem "school system" should be included as part of the **system** labeled "physical education department." Examine the following systems and determine whether or not they should **be included as a subsystem of the system at issue:**

   a. _____ library

   b. _____ locker room staff

c. _____ accounting department

d. _____ physical education students

e. _____ coaching staff

f. _____ intramural aides

g. _____ alumni participating in University athletic programs as financiers, supporters, etc.

* *

b, d, e, and f should be included (but you **could** make a case for including "g"!)

6. The decision to **exclude** or include the alumni in example "g." above should be based upon:

   a. Traditional considerations ("It's never been done before!").
   b. Majority opinion of faculty.
   c. An analysis of the effects of such an exclusion upon the functioning of the system.
   d. Political considerations.

* *

c

7. Although systems "a.," "c." and g." were excluded in the above examples, does that mean, according to the systems approach you are undertaking here, it is thus no longer necessary to include an evaluation of their effect upon the system of interest?
   (yes, no)

* *

Definitely not. They must be included for analysis of their effect upon the system of interest.

8. Recall that the **boundaries** between systems and/or subsystems are called (_____).

* *

interfaces

9. The interface between students and the library materials would be the (_____).

* *

librarian

10. The concepts of **open and closed systems** can be most helpful as a tool in problem definition. Learn the following definitions:

    a. **Information** – Two requirements must be included: (1) **sensory perception or data (pattern)** about the world or about systems which are outside of the system of interest, and which have the special quality of (2) **reducing uncertainty** about the **outside world** such as to make the outside system or world more **predictable.**

    b. **Entropy** – The opposite of information, entropy is defined as a state of chaos or confusion **within** or **outside** the system of interest in which any response to the outside world on the part of the system of interest is random, unpredictable and chaotic, and therefore dysfunctional and dissonant.

    c. **Open system** – An open system functions in an **orderly and predictable** way because its interfaces with outside systems allow **a free transfer of information** between the system and outside systems. The responses of open systems are consistent with the requirements of the external world and therefore harmony exists.

    d. **Closed system** – Random and unpredictable with respect to the influence of outside systems, a closed system is **closed to the transfer of information** about the outside world and is thus inefficient or incapable of responding to changes in the adjacent systems. It tends to be dysfunctional or dissonant within the suprasystem.

    There is no such thing as a perfectly open or closed system. The relationship must be described as **more or less open or closed with respect to some comparative criteria.** Compared to a computer processor, a textbook is (an open, a closed) system according to the criteria in the above definitions.

* *

a closed. There can be no provision for altering, adding or subtracting information about the outside world (unless the kids steal pages!)

11. If a person is standing in the rain and another person walks up and says: "Boy! It surely is raining!" – has there been an information transfer between the two systems? (_____)

* *

no. "Information" also includes a **reduction of uncertainty** as to the state of the outside world. Since the first man already knew it was raining, there was no transfer of information although there were sensory data (pattern) transferred.

12. Indicate whether the following examples, by comparison, meet the criteria for open or closed systems:

    a. University **course** A, in which only authors within the discipline are studied. (_____)

    b. University **course** B, in which any author writing on relevant topics is read, whether he is associated with the discipline or not. (_____)

* *

a closed system
b open system

13. If all courses in a given university were either like "A" or "B" in the above example, which of the graduates would be more likely to be open to and responsive to the events in the world outside of the university after graduation? (University A with courses like Course A, or University B with courses like course B).

* *

University B, because of the greater transfer of information to the student. In the closed University A, the sharing of information becomes more and more narrowed, the system has less and less information about the outside world, and the system's responses will become less and less predictable or appropriate to the events occurring in the outside world.

14. Which of the following is **open** and which is **closed** by comparison?

    a. An instructional development conference for teachers within the school system conducted by interested teachers within the system.(_____)

    b. An instructional development conference for teachers, administrators and specialists within the system conducted by visiting ID specialists. (_____)

* *

a is closed
b is open

15. A system is defined as being **open** when the nature of its (_____) is such as to permit the free transfer of (_____) into its systems.

* * * * * * * * * * * * * * * * * * * *

interface
information

16. Defining systems in terms of openness or closedness will be helpful in locating problem relationships during this first function of the instructional development process, which is called (_____)

* * * * * * * * * * * * * * * * * * * *

identification of the problem

17. The **overriding** consideration during instructional analysis must relate to the **observed behaviors of the learners.** Observation occurs during what stage(s) of the nine-step model? (Stage I, Define, Stage II, Develop, Stage III, Evaluate)

* * * * * * * * * * * * * * * * * * * *

All three stages (Note that more than one answer may be appropriate throughout the program.)

Guidepost #2

You have learned that identification of instructional problems can be facilitated by defining the system at issue and analyzing its relationships with other subsystems. As this is done certain relationships will emerge, as seen in the observed behavior of the learner where the behavior of the learner is somehow **inappropriate, dysfunctional** or **inefficient.** The instructional developer must somehow be able to differentiate these less-than-optimum relationships into **symptoms, as being different from the problem.** Review the definitions of symptom and problem on page 5 (j and k).

18. Symptoms of a problem are sometimes defined as "the" problem by an observer who has incomplete information as to all of the subtle relationships which are present. Consider the following description of an individual who has been defined as a "problem case." Define **the most likely source** of the problem from the following symptoms:

    a. Makes incorrect introductions of people.
    b. Can seldom locate important papers, car keys, personal objects.
    c. Leaves library without borrowed books.
    d. Forgets appointments.
    e. Goes to locations and can't remember why.

f. Enjoys reciting long poems remembered from childhood.
g. Becomes angry when accused of being neglectful of his responsibilities.

* * * * * * * * * * * * * * * * * * * *

Poor short-term memory which, in itself, is a likely symptom of paresis (progressive senility due to brain damage from tumor or circulatory problems).

19. In the above frame, items "a" through "g" are examples of (_____).

* * * * * * * * * * * * * * * * * * * *

symptoms (an unknowledgeable person might say that "g" is his "**problem**", and act accordingly).

20. Consider the following symptoms:

a. Students talk to each other when they should be listening to the teacher.
b. They seldom complete their assignments.
c. There is a higher than average number of parent complaints about the course.
d. The instructor is argumentative with certain of the other faculty.
e. The students, when asked, express "hate" of the course topic.

A keen instructional development person should conclude that:

a. The instructor may be a likely source of the problem, and/or
b. The students may be mismatched with the topic at the wrong level, and/or
c. There may be conspiracy by the other faculty against the teacher.

* * * * * * * * * * * * * * * * * * * *

All are potential problem or dysfunctional relationships, **pending** systems analysis of the setting.

Guidepost #3

Separating the symptoms from the "problem" is a crucial factor in problem definition. However, as one looks at the relationships between the various systems that have been defined and makes tentative conclusions as to the nature of the problem, one does this against some kind of a normative criterion; that is, some kind of an "ought to be." The problem is defined as a comparison of the **status quo** (the way things are) with an **ideal** (the way things ought to be). When more than one person works together, as is the usual case in instructional development, there is often a conflict as to what the ideal should be. A symptom of such a conflict may be seen in differential perceptions as to just what the "problem" **really** is. Much emotional heat (**systems dissonance**) can be generated and time lost by not having a full appreciation of where the "ought to be" or ideal comes from!

21. Using the concepts related to a certain aspect of systems theory, we can refer to an **individual's** total perception of the world as an **image**. This image is shaped by the total history or **experience**, which is the sum of the person's interactions with the world, his natural intelligence and his perceptual characteristics. All of his actions in the world **must** be consistent with his image of the world. A person's **image** is based upon his **perception, intelligence,** and **experience,** which is a part of the (_____) or the way things are at a given point in time.

* *

status quo

22. When **more than one person** can agree upon a **collective image** of the way the world "ought to be," that collective image is called an **ideal**! You can expect that the **observed** behaviors of the learners (and faculty, and administrators, etc.) will be called the (_____) and the **proposed solution** will be based upon (_____).

* *

status quo

an ideal (Note: **image** is held by one person; **ideal** is held by more than one person.)

23. In order for an instructional development committee to agree upon a proposed solution based upon the definition of the problem, there must be an accommodation of their separate (_____) in regard to the total instructional setting, into (_____).

* *

images
an ideal

24. Individuals who have had different basic experiences in their lives must be expected to have different (_____) as to the nature of the world, defition of problems, and characteristics of proposed solutions.

* *

images

25. Sometimes there are dramatic conflicts of images between those who wish to engage in instructional development and those who feel a need to preserve the status quo. As a part of our linguistic heritage, certain unfortunate symbols are often used as weapons. These may be categorized as **value judgments** based upon

unconscious and automatic use of dysfunctional symbols. A value judgment is **less** likely to be based upon **observable facts** (such as behaviors) than on purely symbolic **information.** Identify which of the following evaluative words would **most likely** generate defensive or hostile emotional response in the person to whose actions they might refer:

a. inappropriate _____
b. bad _____
c. inefficient _____
d. stupid _____
e. blame or fault _____
f. dysfunctional _____

* * * * * * * * * * * * * * * * * * * *

If you listed b, d and e as being **most likely** to generate a defensive emotional response, you show evidence of being sensitive to the feelings of others during evaluations of instructional settings. Statements a, c and f all place it incumbent upon the evaluator to specify **criteria** which make the actions appropriate or inappropriate, functional or dysfunctional and so forth. "Good-bad," however, imply **moral judgments** which are legacies from our religious heritage.

In an earlier era even a "good" student was free from evil behaviors and likely to ascend to heaven. To this day, teachers freely evaluate the "good" students as being **preferable** to "bad" ones. However, an objective definition of the problem behavior of the "bad" student may show quite dramatically that his behavior, while perhaps disruptive, is, perhaps, **highly appropriate to his** image of the conditions in the environment!

26. An instructional "problem" is defined as being dysfunctional behavior by the learner. The person who makes such an evaluation is comparing the observed behaviors of the learner to his own (_____) of what ought to be.

* * * * * * * * * * * * * * * * * * * *

image

27. An associate who also examines the problem reaches a different conclusion as to the nature of the problem based upon his (_____) of what ought to be. If they can freely exchange information as to their respective perceptions of the situation they are both (open, closed) systems. They can agree upon an (_____).

* * * * * * * * * * * * * * * * * * * *

image
open
ideal

28. A school whose faculty has been closed to information input from the outside environment will view an innovator as being dysfunctional. The introduction of a change-agent innovator into the system will initially create (systems dissonance, altered school ideals).

* *

systems dissonance (and how!)

29. Evaluators of an instructional setting, may use dysfunctional words such as good-bad, praise-blame, or fault. These are (_____) which may cause emotional behavior such as defensiveness or anger.

* *

value judgments (based upon moralistic considerations)

30. Symbolic statements such as efficient-inefficient are more appropriate than value judgments because the criteria for their use must first be (perception based, symbol based).

* *

perception based

31. Which of the following represents an open instructional system and which a closed system?

    a. A teacher provides all of the lectures and advice to a student on the topic. (_____)

    b. A teacher makes available lectures, advice, media, resource personnel and materials to a student studying the topic. (_____)

* *

a is closed
b is open (There is more opportunity for a variety of related information to be transferred to the student in such a manner that his "interface" with the information can be adapted more efficiently in order to assimilate the information.)

32. A learner's image of the world will be systematically modified by the input of (_____) from the instructional environment. If the person is a closed system, his interaction with external systems is likely to be (dissonant, harmonious).

* *

information
dissonant

33. If a teacher has more of the characteristics of a closed system because of an image of the world which indicates that the safest kinds of behavior lie in maintaining a closed system, what would be a predictable response when such a person is confronted with instructional development activities?

    Answer: (_____
    _____).

* *

Such a person will **resist** (by being defensive) proposed changes in the status quo environment in which his self-image is comfortable and protected. He will have many "good reasons" for putting off the proposal.

Guidepost #4

In this first part, **identification of the problem**, you were introduced to some basic terminology and concepts of systems theory.

The fundamental difference between the dynamics of open systems and the dynamics of the closed systems should be increasingly visible to you. The instructional developer should begin his analysis of dysfunctional systems using perception-based "adequate-inadequate" symbols rather than value judgment "good-bad" symbols.

You should begin to understand that the nature of an instructional problem may reside as much in conflicting images about the status quo, as it does in the functional (operational) relationships between and within the various subsystems.

In your study of the **analysis of the setting** which follows, you will learn to look for the influence of two basic factors which operate in any instructional system:

1. **Functional factors** – operational and physical factors which influence the efficiency and stability of the system's operation.

2. **Human factors** – modifications of inherent functinal relationships due to the nature of individual images of the status quo, in which the "objective" functional relationships may appear discrepant among several observers.

You will learn some additional terminology which will help make visible the complex relationships between the functional and human factors.

PART 2—FUNCTION 2: ANALYSIS OF THE SETTING

OBJECTIVES

1. You will know how to look for **functional factors** during your analysis of the setting.

   a. You will be able to recognize and identify individuals by their characteristics in the following **functional relationships:**

      (1) Gatekeeper
      (2) Decision Maker
      (3) Opinion Leader
      (4) Change Agents

   b. You will be able to make use of Appendices as appropriate for using an algorithm or in developing your own method for systematic analysis of the setting.

2. You will learn to look for and identify **human factors** which influence and modify basic functional relationships.

   a. You will be able to recognize and identify by their characteristics the following types of **life styles:**

      (1) Innovator
      (2) Middle Adopter
      (3) Late Adopter

   b. You will be able to recognize and identify by their characteristics the following **decision-making styles:**

      (1) Creative Problem Solving
      (2) Defensive
      (3) Neurotic

   c. You will be able to recognize, identify, and explain the cause of **polarization.**

3. Given a problem setting which illustrates some combination of the above life styles, decision-making styles, and functional relationships, you will be able to provide a probable definition of the problem using systems principles presented thus far.

CRITERIA:

1. You should obtain +75% similar responses in order to make "good" the goals set for the program.

2. You should strive for +90% similar responses if you wish to begin mastering systems theory or become a systems developer.

1. In the first part of this program you concentrated on (_____).

* *

identification of the problem

2. Using the definitions already given and some common sense, identify whether the following statements contribute to the operation of an instructional setting as a **human factor**, or as a **functional factor.**

   _____ a. The Instructional Media center is 5 miles from the school.

   _____ b. Bill doesn't like Mary.

   _____ c. It takes two days to get slides back from processing.

   _____ d. Old Mr. Blowhard wants the principal's job.

* *

a. functional factor
b. human factor
c. functional factor
d. human factor

3. Examine Appendix 1 for examples of systems which can be found in any school system (Note: **Do not spend more than two minutes studying Appendix 1; just look it over and get an idea as to what is there.** You can examine it later in more detail.) The physical systems illustrated in Appendix 1 can easily be arranged to suit any **functional** purpose. However, unless the **human factor** is considered, no **functional** arrangement, however optimum, can be arranged and be made to work. If the respective image of those involved in managing the respective systems are considerably different, it will not even be possible to define an (_____) toward which you can work in defining a solution, or even identifying (agreeing upon) the basic (_____).

* *

ideal
problem

4. One can paraphrase an ancient cliché and say, "A smoothly running system is a joy forever!" A disruption in the system, however, creates **dissonance** or disruption. In part One you learned that analysis of the setting begins by defining relevant systems and subsystems as they affect the observed behavior of the (_____).

* *

learner (the "learner" is the **principal** focus of all ID activities!)

5. In your detailed analysis of the setting, you must look for relationships among the system's related subsystems, and the relationship of the system to other systems which create **systems dissonance.** Systems dissonance has two basic causes:

   a. Functional irregularities
   b. Human factor (image mismatch) irregularities.

   Look at the following examples of systems dissonance. Identify **which** of the two **basic** causes (i.e., functional or human factors) is represented, or whether both are.

   a. _____ An important memo carrying instructions gets lost and Miss Tizzey fails to carry out her instructions.

   b. _____ Mrs. Battlewagon does not like Miss Tizzey and "forgets" to pass along important instructions so that Miss Tizzey does not do what is expected of her.

   c. _____ Mr. Flinteye spends excessive time in his physics lab, away from students in his study hall, knowing that the kids tend to raise "hell" which he also knows irritates Principal Copout.

* *

a is **functional** in that the procedure for sending instructions did not guarantee that the instructions would get through.

b is **human factor.** For some reason Mrs. Battlewagon feels antagonistic to Miss Tizzey and may genuinely "forget" to pass information in what otherwise would be an appropriate functional relationship.

c is a **combination.** The functional set up (teacher divided between lab and study hall) is such that systems dissonance can operate (kids raise "hell"), and this

functional problem is aggravated by a personality conflict between Mr. Flinteye and Principal Copout.

6. Although a functional arrangement may be optimum, the human factor may modify it. Learn the following definitions of **life styles:**

   a. The **innovator** is the first to adopt an innovation. This person **thoroughly** enjoys the experience of **change even if it's only for the sake of change.** This person will want to try out an idea even if it might fail, just to see what might happen. Variety is the spice of life! and this person likes it hot! This person is an **"open system"** to any possibility of change.

   b. **The middle adopter** is a person willing to try out an innovation, provided that there is reasonable evidence to suggest that the idea will be a success. This person is willing to try change because of its potential utility, not because of getting any particular "kick" out of participating in change. This person is called a middle adopter because such a person is seldom the first to adopt an innovation, and is seldom the last to adopt. This person is an **"open system"** if the change can be demonstrated to be more functional, more efficient, and more effective.

   c. The **late adopter** is the last person to adopt an innovation. Change is a nuisance for this person, who climbs onto the bandwagon more as a result of social pressures than because of a belief in the innovation. It is only **after** considerable experience with the innovation that it becomes acceptable. This system remains **closed** and new information is only grudgingly admitted.

Note: Appendix 2 contains a detailed presentation of some characteristics which research has shown are correlated with the above life styles. Refer to the Appendix briefly and then proceed.

An instructional developer recognizes the need for a **functional change** in order to design appropriate objectives for a learner situation. An analysis of the setting shows that two different faculty members must agree upon his innovative proposal if the new relationship is to work, but one of the two has the characteristics of a late adopter. He can expect that there may be an (_____) mismatch between the late adopter and the other faculty member, a middle adopter.

* *

image

7. Identify which of the image descriptions (innovator, middle adopter, late adopter) goes with which faculty:

   Faculty person A – (_____)

   "The school's system has been good to me. I have done well here for the last fourteen years, and I

think that the students think highly of me. I am especially proud of the methods that I have used, and I have mastered them to the point where the others in this school can hardly hold a candle to me. I think that is at least a partial explanation of my success. I admit that I pride myself of these methods and I continue to work hard in further perfecting their use."

Faculty person B – (_____)

"The rate of change in the society has proceeded at a rapid rate, and frankly the schools haven't kept up. However, I feel that we should not be too hasty about just jumping in and stirring up the pot; there is confusion enough. I personally feel your present methods have done the task in the past, and probably need some kind of modification; although I'll frankly admit, if someone has to stick his neck out, I would prefer it would be someone else!"

* *

Faculty person A is the **late adopter.** The clue is the egocentric consideration of his own place in the system, and his perception that his part in the state of affairs is faultless. Such statements indicate a strong need to preserve the security of the status quo. The need to preserve the status quo does **not** mean that the person is not dedicated, nor unprofessionally motivated. It may mean that the person is a closed system; however, in that his quest to preserve the status quo has caused him to shut himself off, to "close his interfaces" to dissonant information from outside.

Faculty person B is the **middle adopter.** The clue lies in his willingness to acknowledge the need for change and his natural reluctance to depart from the familiar. Such a person is more open to the input information, and will more likely respond to reasonable argument since he does not feel a compelling need to defend the status quo and his part in it.

8. Learn the following **functional relationships:**

   a. Gatekeeper – Such a person serves as the interface between two systems and is in a position to control information by permitting or not permitting information transfer between the systems; or equally important, to filter or modify the nature of the information being transferred.

   b. **Decision Maker** – This person is invested with **either formal or informal** authority to make decisions which will be binding upon the associated group.

c. **Opinion Leader** – This person is perceived by the group to have **high** credibility in the area in which his opinions are believed valid. An opinion leader in area "A" (e.g., curriculum) may not be perceived by the group to be credible in other areas (e.g., personnel). An opinion leader **may or may not** also be the decision maker for the group, but you may be certain that if he is not, he will most likely be perceived as having high credibility in the **image** of the person who is the decision maker.

d. **Change Agent** – A change agent is a person who perceives there is a needed change in the functional relationships of parts of a system, and seeks to bring about the conditions which will cause the change.

Which of the functional relationships described above, would **most** apply to the school personnel as they are described below:

(1) _____ the secretary to principal Copout.

(2) _____ nominated as spokesman to represent faculty at administrative meetings.

(3) _____ president of school board.

(4) _____ elected chairman of the instructional development steering committee.

* *

(1) gatekeeper
(2) opinion leader
(3) decision maker
(4) change agent

9. The opinion leader is usually the **key** in the successful diffusion and establishment of any innovation or change in the status quo. The opinion leader derives his status because **he is the person that the group perceives most reflects their group norms!** You can expect that the (_____) of the opinion leader as to the nature of the status quo reflects the consensus or (_____) as held by the group at that point in time.

* *

image (relates to **one** person)
ideal (relates to group)

10. Which of the following individuals in a school system would **most likely approach the change agent** to support his proposals? (_____)

a. middle adopter
b. innovator
c. opinion leader
d. late adopter

* *

innovator (he is excited by any prospect of change).

11. The innovator in a group would be the most likely person to approach the change agent in support of a new proposal. Which of the following would most likely be perceived by the group as a deviant and outside of the group's norms and thus invested with the **least** credibility? (_____)

a. middle adopter
b. innovator
c. opinion leader
d. late adopter

* *

the innovator! A late adopter would be less likely to be perceived as a deviant because he tends to be less aggressive and hence less visible than the innovator.

12. The change agent, since he may be viewed as a **deviant** by the group, must establish and get the support of the (_____) while analyzing the setting, if genuine instructional development is to develop a healthy atmosphere for growth.

* *

opinion leaders (Note: A decision maker may be operating from policy, or he may hold his position by administrative edict rather than by group nomination.)

13. If you were a change agent, which of the following strategies would **most** likely earn the respect and support of the opinion leaders?

a. Write up a detailed proposal of what the new idea is all about and present it to the opinion leaders so that it is clear what they have to do.

b. Have the administration endorse the proposal and recommend its adoption.

c. Involve the opinion leaders in the analysis of the setting and problem definition.

d. Have the innovator try out the idea on his own.

* *

c (By all means')

14. An **inexperienced** change agent, looking for support for his proposals, will often accept the overtures of the innovator whom the opinion leaders may view as a (_____).

* *

deviant (person with low credibility)

15. A change agent serving as chairman of an instructional development steering committee, may wish to keep the principal apprised of the committee's progress in order that the principal will appropriate the necessary funds when the time arises. The principal serves in the role of (_____) as to the allocation of funds, but his assistant who handles all of the report memoranda and other details serves as (_____).

* *

decision maker
gatekeeper

16. It happens that the chairman of the steering committee and the principal's assistant, Joe, have a serious personality conflict. Unless the principal is aware of this disturbance (**systems dissonance**) in the functional relationship between the chairman and Joe, the input (information) to the principal in regard to the committee may be:

    a. denied
    b. amplified
    c. filtered (distorted or biased)
    d. ignored

* *

c. filtered

17. Match the following "images" of the world as they would most likely apply to the individual listed: (Answers may be used more than once.)

a.	_____	"Nothing ventured, nothing gained. Better to have tried and failed than never to have tried at all."	1. Decision maker 2. Gatekeeper 3. Innovator

b.	_____	"That others respect me is the most important thing in the world . . . I like others to come to me for ideas.	4. Middle Adopter 5. Late Adopter
c.	_____	"There is nothing I like more, nor could ever imagine better that what I am doing right now."	6. Opinion Leader
d.	_____	"I feel, deep down, that I am actually incompetent, but so far, no one seems to have noticed. I hope that no one rocks the boat!"	
e.	_____	"Come let us reason together' is one of the most beautiful sentiments ever expressed."	

* *

a. - 3
b. - 6
c. - 5
d. - 5
e. - 4

18. A change agent with a radical and controversial innovation concentrates mostly on an opinion leader during analysis of the setting and definition of the problem, and does **not** involve other elements of the group from which the opinion leader derives his status. The **most likely** outcome of this kind of strategy is:

a. The group accepts the proposal on the basis of their faith in the opinion leader.

b. The opinion leader refuses to accept the evidence which indicates a need for the novel approach to the instructional problems.

c. The opinion leader loses his status and credibility with the group.

* *

The change agent violated a fundamental premise of systems development, by taking a bilateral approach (the opinion leader, and me). Research shows that the typical outcome costs the opinion leader his status, or a condition develops called **polarization. All** related systems must be included or taken into account during instructional development.

19. **Polarization** is the grouping of a set of individuals with similar images, who thus propose a particular **ideal**, in regard to the **referrent situation** (i.e., the perceived instructional problem), and who become a **closed system** with respect to another group of individuals with a different ideal in regard to **their** perception of the **same** referrent situation. In the above example involving the change agent and the opinion leader, describe briefly how you would know polarization is present in the school as a result of the change agent's strategy.

Answer: (_____
_____
_____
_____).

* *

You should have pointed out that some staff in the school would have sided with and defended the opinion leader, but a **rival opinion leader** would have emerged and used the occasion to gather those less loyal to the opinion leader unto himself. There would be **overt** disagrremet with feelings at a **high** emotional level.

20. The problem with polarization, the severest problem that can be encountered in instructional development is that each of the conflicting groups **must** become (_____) systems in order to preserve their own collective image or (_____).

* *

closed
ideal

21. When systems become closed to each other, as in polarization, it is impossible or difficult for (_____) to be transferred across the (_____) between systems.

* *

information
interfaces

22. When a system is closed to information, it can hardly be expected to respond to changes in the outside environment. Following are some examples of **organic** systems which become closed to changes in the environment: dinosaur, mammoth, pterodactylus and the awk. What one thing do they all have in common?
(_____
_____).

* *

They all are extinct!

23. Following are some examples of **social** systems which became closed to input (and therefore unresponsive) regarding the changing information in their external environments.

    a. American Guild of Candle dippers
    b. **Saturday Evening Post**
    c. Hudson Motor Corporation
    d. Astor Hotel

    What one thing do they all share in common? (_____
    _____).

* *

They are all extinct.

GUIDEPOST #5

You should now be developing an appreciation for the clear difference between **functional factors** which are operating in a setting, and the **human factors** which may have **major** implications for the functional relationships.

A person may have a **functional** relationship as an opinion leader for a group, in that people seek him out for advice. But there will be considerable differences in his responses to situations based upon whether he has a late-adopter life style or a middle-adopter life style.

A change agent who has a functional relationship with a **decision maker**, needs to have an accurate perception of the decision maker's life style.

A person who is a change agent can meet all needs of his functional responsibility by identifying problems, analyzing settings, organizing management, and eventually proposing solutions; but if these functional activities are perceived as threatening because of the effect of **human factor** considerations (including his **own** life style), there will be no useful or permanent instructional development in **that** system!

In the following segment you will see how **decision-making characteristics** of various individuals can further modify basic functional relationships.

24. Learn the following definitions:

a. **Creative (problem-solving) behavior** is recognized in an individual's **searching** behavior, in his **openness** to admitting new information, even when it conflicts with his particular image of the world. A person who uses creative problem-solving behavior feels it is **more important to be informed than to be "right"** and consequently approaches problems or systems dissonance in an anlaytical manner.

b. **Defensive behavior** is seen in a person who is driven, or who feels a strong need to **protect** his present image of himself and the world. This person's behavior is **selectively open and closed.** The criterion depends upon whether the information is perceived as threatening the security of his status quo. Because the person must perceive external information **selectively,** he will edit and filter the data in a manner which is consistent with the image he must preserve.

c. **Neurotic behavior** is a more aggravated version of defensive behavior; but the source is more deep-seated and relates to a basically unhealthy, hostile or fearful image of the world as expressed in a complete style of living, usually learned in childhood. The system is completely closed to the input of new information which threatens his particular style of interacting with other systems in the world. Regardless of how inefficient, inappropriate or dysfunctional his present behavior may be in attaining even his own objectives, such a person will **deny** or repress any information which contradicts his justification for his life style and his image of the world.

A team of change agents, as the result of careful analytical evaluation of functional relationships, i.e., work loads, schedules, physical settings, test scores and needs of the community, proposes certain basic changes in the school curriculum. Based upon the above decision-making characteristic definitions, what should the change agent expect as a **typical** response:

a. The Creative response would . . . (_____
_____).

b. The Defensive response would . . . (_____
_____).

c. The Neurotic response would . . . (_____
_____).

* *

The creative response would be interested (and often excited) about the data which indicate the need for change.

The **defensive** response would **selectively** seek out those data which would verify that the proposed change not threaten or alter the individual's present status in the system, or that any change would **clearly** enhance his position in the system. **(This response is typical for most people.)**

The **neurotic** response would **deny** the validity or even the existence of the data, and would probably refuse to even **look** at it!

Note: Late adopter life styles tend to be basically defensive, but **not always.** Both late adopter and innovative life styles **may be** neurotic.

25. A late adopter could be expected to have which decision-making style when confronted with a major change in his instructional style?

    a. problem solving (creative)
    b. defensive
    c. neurotic

* *

defensive

26. You can expect that if there is opposition to change on the part of an individual, by far the most common noncreative decision-making style will be:

    a. defensive
    b. neurotic

* *

defensive

27. A change agent can expect to meet more resistance in a system whose characteristics are essentially (open, closed).

* *

closed

28. If a change agent conducts his analysis of the setting in such a manner as to be perceived as a threat, he can expect that any proposal associated with his activities will meet with (_____).

* *

defensive

29. One of the first tasks of any change agent is to arrange the systems such that (_____) behaviors can be changed to (_____) behaviors.

* *

defensive
creative (problem solving)

30. The change agent should be prepared to (correct, ignore, neutralize) neurotic opposition to a proposal for change as part of his strategy in analyzing the setting.

* *

neutralize – Even if the change agent has the expertise, there is not sufficient time to get at the heart of a genuine neurosis. However, ignore such behaviors contradicts the assumptions of a systems approach. Unless the neurotic's behaviors are neutralized, they will work against the proposal and be a source of systems dissonance with possible adverse effects upon the learner. Note that "neutralize" does **not** mean destroy! It means to place the neurotic opposition in a context in which it will not obstruct progress, but (hopefully) will enable the neurotic to eventually come to feel **useful** and **comfortable** in the new setting.

GUIDEPOST #6

In the preceding frames, the human factors involved in definition of the problem and in the analysis of the setting have been considered in some detail. The following portion of the program is to assist you in your **functional** analysis of the instructional setting. Since each instructional setting may differ considerably from school to school, the data which follow have been organized **only as a guide** to provide you a starting point.

You will be asked to make references to the Appendix for certain materials which have been organized there for you. During your first working of the program, **do not** spend excessive time studying the Appendix materials. Simply consult them long enough to get an idea of what they are about. Later, you can go to them for guidance as you actually become involved in instructional development.

31. Earlier you consulted Appendix 1 and saw how the various systems which interact with the learner could be broken down into plysical and communication systems. You have been studying how the human factor can operate across those various systems. Now you need to find some way to collect **information** which will help illuminate the instructional problem and suggest an "ideal" solution. In order for information to flow freely, the systems involved must have interfaces which are (_____).

* *

open

32. Look at Appendix 3, and notice the kinds of questions you should expect to ask during your detailed analysis. The Appendix suggests that the categories and questions listed:

a. Are of a similar nature to the questions you should ask, based upon your particular circumstances.

b. Are **the** questions which must be asked as stated.

c. Are examples of good questions but will probably have little relevance to your particular situation.

* *

a.

33. Now that you have gone over Appendix 3, you can see that an accurate definition of the problem(s) depends upon a **thorough** analysis of the setting. You can expect that the implications of your findings will:

b. Be unrelated to other instruction taking place in the school.

b. Go unnoticed by opinion leaders and their followers.

c. Possibly have some implications for some practices in the school other than the one of immediate focus.

* *

c.

34. Turn to Appendix 4 for some examples of **sources of information** which will be useful in obtaining answers to some of the questions listed in Appendix 3 or in terms of your own needs. You can tell that exhausting the possible sources for getting the basic information needed can:

a. Easily be accomplished by yourself.

b. Be overlooked and still minimize the probability of creating systems dissonance upon establishment of the instructional modifications.

c. Be a team effort.

* *

c. The whole point of the systems approach is to facilitate the contributions of **all** interested parties, while minimizing the influence of any single individual or pressure group.

35. Appendix 5 provides a detailed example of the kind of organization format which has been used for a detailed analysis of the total resources available to a school system in order to most efficiently marshall instructional resources and match them with community resources.

36. Appendix 6 provides an example of how your analysis of the setting can be linked with your anticipation of writing instructional objectives and selecting instructional strategies. Figure 1 (page 3-4 of Appendix 6) suggests the relationship of media alternatives to differing levels of perceptual and symbolic skill. Suppose that your analysis of the students shows a very **low** level of symbolic (verbal) and perceptual abstraction ability. According to Figure 1, you would anticipate the most appropriate strategy will probably emphasize:

    a. Lectures
    b. Audio tape, motion pictures, television.
    c. Laboratory experience, and directed actual "hands on" involvement.

* *

    c. The learner will need **directed experience** so that there can be immediate feedback during the critical period of symbol acquisition and organization. Then the learner will need progressively less observation and can move on to simulations and the other media which require progressively higher symbolic and perceptual skills.

37. In analyzing the setting to assist in the definition of the problem and in proposing a solution, you must consider both the **functional relationships** of the various systems and subsystems with each other, and their inevitable modification by the **human factor**. The tendency of many individuals who wish to improve instruction is to concentrate on the functional relationships. However, most instructional development falls short; most innovations fail, are discontinued after they have been adopted, or take 40 years to win widespread acceptance because (_____
_____).

* *

    instructional designers fail to understand or appreciate the importance of, and and allow for, the human factor!

GUIDEPOST #7

In the parts of this program which you have now completed, the first two functions of the nine-step instructional model have been emphasized. These functions were "definition of the problem," and "analysis of the setting." In this final part of the program you will study the third function, "organize management, which concludes Stage I (Define) of the model.

You have been looking at some of the considerations in defining the problem and analyzing the instructional setting. In this final section,you will study some of the considerations in mobilizing and organizing the resources available to **define**, **develop** and **evaluate** an optimum **learner** situation.

Keep in mind that the **study** of systems approaches to instructional development is necessarily linear, but that true systems **functioning** is nonlinear and has a Gestalt or everywhere-at-onceness quality. Even as you organize your resources in order to begin what is called Stage II (Develop) of the model, you will see that there has to be some kind of organization in order to anticipate evaluation of problem solutions. There is nothing sacred about any model. A model is simply a **convenience** for organizing, developing, evaluating, and communicating.

PART 3—FUNCTION 3: ORGANIZE MANAGEMENT

OBJECTIVES

1. You will be able to define the following terms, or recognize and label the associated phenomenon or item as they occur in instructional settings:

   a. Feedback
   b. Time Line
   c. Critical Path
   d. PERT
   e. Channel
   f. Algorithm
   g. Flow Chart
   h. Task Analysis.

2. In organizing human resources to undertake instructional development, you will account for and include provisions for the following **functions:**

   a. Steering
   b. Design
   c. Development
   d. Operation.

3. Given a description of an instructional setting, you will:

   a. Identify symptoms of systems dissonance.

   b. Recognize life styles and decision-making characteristics and label them.

   c. Define a strategy for reorganization to reduce systems dissonance using the principles presented in this program.

CRITERIA

1. You should obtain +75% similar responses in order to make "good" the goals for the program.

2. You should strive for +90% similar responses if you wish to begin mastering systems theory or become a systems developer type person.

1. Upon the conclusion of your instructional development process, an observer after looking at the results should exclaim:
"W-W-WHOW!! When he does this you should **immediately** be able to state:

   a. WHO – was given responsibility and **commensurate authority.**

   b. WHAT – instructional alternatives were considered, and what personnel and material resources were brought to bear.

   c. WHEN – in sequence they were brought to bear in order to meet the proposed objectives and in order to meet predictable deadlines.

   c. HOW – personnel and material resources were organized and the total system was organized to function in an effective manner as measured by predetermined specified criteria.

   The purpose of this part of the program is to provide some insight into the variables which bear upon the organization necessary for instructional development. You can expect to have to apply the information you obtained in the two earlier parts of the program called: (_____) and (_____).

* *

Identify the Problem
Analyze the Setting

2. One of the common occurrences found in looking at situations where there has been an assignment of **responsibility** (Who), is that for some reason, there has been a failure on the part of the administrator to **also** assign commensurate **authority.** Such an inequity can create systems dissonance. Which of the following policy statements is **least** likely to contain seeds of **systems dissonance?** Principal Jones announces:

   a. Mr. Rappoff is assigned to chair the steering committee to develop an instructional model for a more effective reading program, and to initiate all actions necessary toward that end. I will expect regular progress reports and I will involve myself in the committee activities as needed.

   b. Mr. Rappoff is assigned to chair the steering committee to develop an instructional model for our reading program. I expect to be consulted in time to make decisions in regard to any implications affecting the expenditure of funds or to evaluate any implied changes of policy.

   c. Mr. Rappoff is assigned to chair the steering committee to develop an instructional model for a more effective reading program. I don't want to hear about it until the committee has made a firm proposal for change.

* *

a is least likely to create dissonance.

b amounts to a vote of no confidence. The committee will find themsevles saying, "What will Jones say? " and "We'd better get Jones' o.k. on this." in regard to every trivial matter. Net result . . . poor morale and an emerging "ideal" more like Jones than in response to the information input from the environment.

c Jones will **certainly** make his input **after** the work has been done. Net result . . . poor morale and a belated vote of no confidence. Also, Jones' input is certainly needed during analysis of the setting since he is a part of the setting.

3. If a principal or person in authority, i.e., a committee chairman, has decision-making characteristics which are **defensive**, such a person will typically assign responsibilities without (_____) in order to insure that his position will be protected and that he knows "what's going on."

* *

commensurate authority (Note: This is just one example of a human factor disrupting the functional factors.)

4. In conducting instructional development it is more efficient to assign responsibility and authority in order to effect a **division** of **labor** for using a person's energies and time efficiently. **Four basic functions** must be accounted for in instructional development. These four functions can be met by a single person if the project is very small, or the project may require four separate committees if it is very large. Learn the following functions:

   a. **Steering** – Overall coordination and direction of progress through the nine-step instructional development model and for expediting the other functions. Emphasis on the **coordination** of who, what, when and how.

   b. **Design** – Definition of the problem, analysis of the setting, generation of the ideal, and recommendation of the detailed course of action to be taken in solving the instructional problem (Note: "Design" of the nitty-gritty **components** of the system is a part of the **development** function.

   c. **Development** – Design and production of **software**, evaluation and selection of attendant **hardware**, organization and testing of the components into the actual instructional system and definition of operating policy. **Initial** testing of the alternatives recommended by the design implication.

   d. **Operation** – Operation of the system, establishment of operating policy, maintenance of software and hardware, **routine** testing and evaluation of the success of the system in terms of its stated objectives. The results of Steering, Design and Development should be visible to any observer, and the questions Who, What, When and How answered.

Look at the following activities and determine which function they most represent:

a. _____ Evaluation of four different models of single concept film projectors.

b. _____ Assignment of Mrs. Williams as chairman of the Design Committee.

c. _____ Preparation of an opinion questionnaire to be filled out by students in regard to the proposed instructional project.

d. _____ Taking a trip to Supersuccess school system to determine if it's worth a trip by the design and development committees.

e. _____ Managing a filing system for information storage and retrieval for students using the instructional system.

f. _____ Preparing, testing, and modifying a questionnaire for use by students who will participate in the new system.

g. _____ Giving tests and evaluations to students participating in the instructional system.

* * * * * * * * * * * * * * * * * * * *

a. development
b. steering
c. design
d. steering
e. operating
f. design
g. operating

GUIDEPOST #8

Here are some important considerations in regard to the problem of "**control.**" What you are really learning during this sequence is the dynamics of "controlling" people. The thought of such an activity often arouses, in certain individuals, a strong negative emotional response. Therefore, it is imperative that the question of "control" be met head-on.

Whether we like it or not, most of what we do is "controlled" by other people. This is the first requirement of any society. The fact that you are even reading this implies

control by other people. When someone asks you for a favor, they intend to control your behavior. Your choice of books for student use implies that the ones chosen are "better for them" than those not chosen. Many persons would quit their present employment were it not for families who control the person's behavior: "I can't quit, I have a family to support." Tax money is taken from you by people you don't know, whether you like it or not; and you don't know or even have a say in how it is spent except indirectly. Everywhere you look, people are "controlling" other people – by direct means, by coercive means and by subtle means. Advertising often influences you to purchase option "A" over option "B" in many cases whether it is in your best interest or not; and what is more, your hard-earned money goes to pay **their** cost in influencing **you.** Every student in your school is systematically being controlled by you and by the staff which operates that school. **You** are controlled by the administrative staff and other faculty through policy statements and social pressures. **The problem of being "controlled" in a complex society is unavoidable.**

The purpose of the systems approach is to be as certain as possible that the behaviors of individuals are "controlled" in a way which is **consistent with the total demands of the environment,** and not by the skilled manipulations of one or a few individuals acting independently or in concert! If a systems approach is truly successful, the satisfaction of **all** members of the system will be maximized. The function of the systems approach is to **open** all transfer so that there can be a total and coordinated response to the requirements of the environment, and to minimize the selfish (closed) demands of political considerations, vested interests, as well as to minimize the debilitating effects of defensive or neurotic practices, policies, groups and individuals. In the following frames you will see how **systems dissonance** can be managed. The word "managed" implies that the participants can be deliberately placed in a state of optimum satisfaction when dissonance is managed and reduced.

According to the philosophy of this systems approach to instructional development, your system is **not** a success if its **only** effect is to increase student performance and satisfaction. Your systems approach to instruction is only "successful" when student performance is increased when, faculty and staff satisfaction is increased, and when the school is a source of pride and admiration to the community. Of course, you may accurately observe that the ideal state can never be achieved. But according to relativity and probability theory, you have **better odds** in approaching such a state with an effectively applied **systems approach** than with any militaristic unilateral or bilateral approach.

5. In arranging for instructional development to occur, the cooperation of many individuals within the school system will be needed. In order to identify and correct instructional problems, information in the total environment must be gathered and evaluated. You can expect that individuals participating in this activity may perceive the same events differently due to differing:

    a. Images of the world.
    b. Academic backgrounds and training.
    c. Life experiences.
    d. Physical and intellectual characteristics.

a is the most inclusive answer. It includes all of the other options.

6. Unfortunately, arguments are often generated as to what the **real** problem is, or what an event really means. The participants argue about the functional nature of the event, when a basic cause of their differences might well be (_____ _____).

* * * * * * * * * * * * * * * * * * * *

different perceptions due to different images

7. The function of the steering committee is to:

   a. coordinate and direct
   b. investigate and develop
   c. visit parents
   d. order equipment

* * * * * * * * * * * * * * * * * * * *

a

8. **Feedback** is an important concept in communications and has major functional implications for instructional development. **Feedback** is a special kind of **information returned** to the sender of a communication, as to the **effect** of an original communication. Which of the following is an example of **feedback**:

   a. A child asks a teacher to be allowed to leave the room.
   b. A teacher tells a child how to accomplish a task.
   c. A teacher corrects a child's mistake.
   d. The teacher reads a memo from the principal.

* * * * * * * * * * * * * * * * * * * *

   c. Correcting the child's mistake (the original communication) is **returning** information to the child as to the effect of the original communication.

9. Many instructional settings have inadequate provisions for feedback. The learner system has no information as to the effectiveness of his responses. Management of the instructional development process must include provisions for channeling feedback among **all** of the participating subsystems. Which of the following examples might be a symptom of **inadequate** feedback?

   a. Students talk to each other instead of working independently.

   b. Students show a high error rate during an examination over material they have been studying for three weeks.

c. There is high absenteeism in class.

d. Boys make more errors than girls on the test.

* *

b. The symptom (high error rate) indicates that the students have been **practicing** making mistakes up until the exam. Had there been provision for feedback, the mistakes could have been corrected when they were originally made. A secondary **symptom** might be "a" in which talking to each other is more rewarding than studying and is thus **appropriate behavior when viewed from the students' perspective**, but disruptive when viewed from the teacher's perspective. There is a mismatch of images as the result of, in part, a lack of feedback.

10. Feedback is important whenever there is a need for coordinated activities among more than one person, which is one way of saying most of the time. A principal wishes to engage in instructional development and hopes to involve his faculty. Which of the two options is preferable and why?

a. Option a: A steering committee is composed of four faculty members. The principal then selects four different faculty members for each of the remaining committees.

	Steering	Design	Development	Operations
Chairman–	A	E	I	M
	B	F	J	N
	C	G	K	O
	D	H	L	P

b. Option b: A steering committee is composed of four faculty members, chaired by "A." Each of the four members of the steering committee is assigned to chair one of the three remaining committees which are then filled with different faculty members.

	Steering	Design	Development	Operations
Chairman–	A	B	C	D
	B	E	H	K
	C	F	I	L
	D	G	J	M

* *

b. because of the provision made for feedback. Each of the committees can be considered to be a subsystem. In option "a," there is no provision made for a **common interface** between subsystems. The opprotunity will be ripe for

conflicting images to develop into inefficient behavior or at the worst, a state of polarization. Option "a" is a poor **functional relationship** which can generate "personality conflicts" and, at best, may operate inefficiently. Option "b" allows for the **steering committee to serve as interface** and facilitate feedback among the subsystems, thereby expediting and facilitating their coordinating function.

11. Both **functional relationships** and the **human factor** must be taken into account in assigning committees and in expediting their progress. One of the characteristics of a functional relationship is the **channel** through which information must be transferred. A **channel** is the **medium** carrying the information. It can be a person or a "thing" so long as it is the provision for allowing information transfer between systems. Which of the following qualify as a channel **from the information given about them.**

    a. An envelope with an address written on it.
    b. An unmarked envelope.
    c. A courier carrying an attache case.
    d. A telephone link.
    e. Two gatekeepers who link their respective subsystems.

* *

a is a channel
b is **not** a channel
c is **not** a channel (a letter he is carrying in it may be)
d is a channel
e is a channel

12. For the purposes of instructional development, example "e" above is of prime importance. The individuals who serve as interface or liaison person in an information channel between systems also serve a (_____) function.

* *

gatekeeping

13. Such a functional relationship may appear ideal, but suppose that Mr. Gohard serves as gatekeeper for the Design Committee, and Miss Beguiling was asked to serve as gatekeeper or liaison person for the Development Committee. As Chairman of the Steering Committee, what might you expect when you find out that Mr. Gohard is thoroughly turned on by Miss Beguiling, who is thoroughly turned off by Mr. Gohard? (_____
    _____
    _____

* *

There is a high probability of **systems dissonance** here due to editing, and filtering across the Gohard-Beguiling interface. You should seek to neutralize this situation by establishing more than one interface and/or assigning Gohard or Beguiling to other functions.

14. The above example of systems dissonance was created by (a poor functional relationship, the human factor).

* *

the human factor

15. A common problem due to the human factor in committee functioning involves the definition of individual responsibility and the responsibilities of the committee itself. Part of your analysis of the setting will enable you to **match the human factors with the functional requirements of the committee.**

    Which of the following persons would have the **highest** probability of success as Chairman of the Steering Committee in diffusing (disseminating) an innovative instructional method:

    a. Mr. Innovator
    b. Mr. Opinion Leader
    c. Mr. Key Decison Maker
    d. Mr. Late Adopter

* *

Mr. Opinion Leader – His prestige and status will give the committee credibility, and his stability will provide continuity between the old and the new. Be certain that Mr. Opinion Leader is also a **middle adopter** and not a late adopter. Should Mr. Opinion Leader be a late adopter, then you should suspect that the school will have many of the characteristics of a **closed** system.

16. Which of the above individuals would best serve as Chairman of the Design or Development Committee, given the stabilizing influence of the opinion leader as Chairman of the Steering Committee? (_____)

* *

Mr. Innovator – His zest and enthusiasm will help carry over the innumerable frustrations which arise during that phase of the instructional development sequence.

17. What are the two basic factors which must be taken into consideration in undertaking instructional development? (_____) and (_____)

* *

functional relationships
human factor

18. No matter how well you organize a system, there will always be some dissonance remaining. Systems dissonance can arise when some subsystem within a system cannot be made to be entirely compatible with the purposes of the system. Which of the following would **most** likely be a source of systems **dissonance?**

    a. A member of the accounting department on the steering committee.
    b. A late adopter type person serving in a nondecision operating function.
    c. An opinion leader in the development function.
    d. An innovator type person is a routine operating function.

* *

d – Because such a person might insist on operating (experimenting) in a manner inconsistent with the designed purpose of the operation function. His input and life style would be more useful at the design or developmental level, where change is at issue and where the evolving system has not been completely defined. A late adopter would feel more comfortable where his actions are prescribed and he could be less defensive about problems occurring in the system.

19. Which of the following would be a possible source of systems dissonance?

    a. The chairman of the steering committee assigns responsibility to Mrs. X, who is to chair the development committee; but all proposals must be reviewed first by him and all decisions must have his written approval.

    b. A member of the media library is assigned to the operating committee.

    c. Certain students are assigned to the design committee.

* *

a – The responsibility **with commensurate authority** requirement is ignored and could become a major source of dissonance.

Note that "c" supports a fundamental assumption of systems development by creating a subsystem (the design committee) with provisions for input from a prime source of relevant information (i.e., what the students are doing and how they perceive what is expected of them). You might pause to consider why some faculty might believe such an arrangement would be disruptive!"

20. In organizing committees, not only must the functional relationships be logical and responsive to information input, but the (_____) must also be accounted for.

* *

human factor

21. In attempting to create change within an instructional system (however justified by information available within and outside of the relevant systems), failure to account for the human factors will inevitably lead to (_____) behaviors and a "choosing of sides" or (_____).

defensive
polarization

22. Throughout the instructional development process, definition of the problem, analysis of the setting, and organization of management must all be accomplished in consideration of the learner's observable (_____).

. . . . . .

behavior

GUIDEPOST #9

In this portion of the program, you have been studying how the human factor relates to and can modify functional relationships during organization of management. You learned that four basic functions must be fulfilled: steering, design, development, and operations.

In the following and concluding portion of the program you will concentrate on some of the functional considerations in organizing an instructional development program. You will be referred to appendix material, and as before, look briefly at the references and then go on. Do not take time to study them in detail until later, when there is more time.

22. One of the more helpful devices in plotting a course of action is an **algorithm**. An algorithm is a series of **if-then** statements, or a series of questions and answers, the answer to which indicates the next step. Which of the following statements are in algorithmic form?

    a. Does the learner's entry behavior meet the requirements of the setting?
       If yes, go to item 2.
       If no, go to item 3.

    b. After ten minutes, return items to shelf.

    c. Are there more than 12 students available for the game but fewer than 24?
       If yes, form two teams of fewer than 12 as evenly divided as possible.
       If no, play the game with one team of 12 or fewer.

d. All students should work for 20 minutes before stopping.
Students who finish early should see the aide.
Students who don't finish should see the instructor.

* * * * * * * * * * * * * * * * * * * *

a
c
d

23. A **flow chart** is a series of statements indicating the steps of a procedure and is often in algorithmic form or has portions of it which are in algorithmic form. Refer to **Appendix 7** for an example of flow charting. As you look at flow charting, consider functions that flow charting could serve during the various phases of **instructional development.** For example, flow charts could be useful in some of the following applications:

a. The steering committee could develop a procedural algorithm for use by the design, development, and operation committees.

b. A decision-making algorithm for budget decisions to be used by the design committee during their planning could be developed.

c. An algorithm or flow chart could be developed for interpreting and coping with community opinion on a variety of topics.

d. An algorithm could be developed by the steering and design committees for analysis of the setting and definition of the problem.

e. An algorithm of criteria could be developed on procedures for establishing committees.

f. An algorithm could be developed for evaluation based upon probable responses to an instructional setting.

(Go on to #24)

24. Part of the responsibilities of instructional developers is to conduct **task analysis.** Task analysis can be possible in any of the following areas:

a. Specific learner tasks.

b. Functional relationships within and among systems such as faculty, aides, specialists, and administrators.

c. For the establishment of responsibility and commensurate authority for the various members of an instructional development task force.

An integral part of task analysis involves using tools such as (a_____) and (f_____).

* * * * * * * * * * * * * * * * * * * *

algorithms
flow charts

25. By means of a task analysis of the learner system and associated systems, you can expect that identification of the (p_____) and the (a_____) of the (s_____) can be facilitated.

* * * * * * * * * * * * * * * * * * * *

problem
analysis
setting

26. Consult Appendix 8 for extensive information on task analysis which is helpful during Stage I activities of instructional development. On page 2 of Appendix 8, the flow chart shown is entitled "Analyzing Operationalized Dependent Variables." To operationalize means **to label** in such a way that the **operationalized variable is clearly visible to anyone who is observing.** Which of the following dependent variables have been **operationalized?**

    a. Will be satisfied by his work.
    b. Will select nine out of ten defective parts.
    c. Will identify all of the staff who meet the criteria for **late adopter.**
    d. Will express an honest opinion of his feelings.

* * * * * * * * * * * * * * * * * * * *

b and c – Both are operationalized because any independent observer, **given the criteria,** can verify the behavior.

a – There is no way any independent observer can determine "satisfaction" since it is not operationalized (defined in **visible** behaviors). The same reasoning applies to "d."

27. A **dependent variable** is a variable in a situation which is controlled by an outside factor (independent variable). If an instructional setting is the independent variable controlled by the instructional developer, what is the **dependent** variable which should be controlled by the instructional setting? (_____ _____).

* * * * * * * * * * * * * * * * * * * *

The behavior of the learner.

28. Using the procedure outlined on page 2 of Appendix 8, you can conduct a task analysis of not only the instructional setting as indicated in the example on page 2, but also the tasks set before the instructional development team. Notice the actual instructional example given on page 3 of Appendix 8 which mentions "objectives," "entry behavior," and "evaluation." In a subsequent phase of the Institute, you will study the details attendant to writing objectives. You will also study details concerning evaluation at a later date. In regard to the entry behavior of the students, during what phase of the instructional development process would you expect to begin defining that behavior? (_____).

* *

During your definition of the problem and analysis of the setting phases.

29. Notice that the **objective** is a concise statement of expected **behaviors.** You should expect that the objective was agreed upon by reference to an (_____).

* *

ideal (if you thought of an instructional development team)
image (if you thought of an individual instructional developer)

30. Later, when you use Appendix 8, you will find out that it has two basic parts:

    a. A general consideration of the factors involved in task analysis.

    b. A specific example of how Dr. Yelon, a consultant, worked with a faculty member to develop the flow chart and algorithm for teaching "Prorating Using a Monroe Calculator."

    In the example, you will see how it is possible to **minimize** the emergence of defensive behaviors on the part of a faculty member, and bring forth problem-solving behavior. (p 8-19).

    After looking through Appendix 8, go on to #31.

31. After you have completed or are nearing completion of your analysis of the various systems influencing the instructional setting, your design and development staff will need to develop a special kind of flow chart which will indicate the step-by-step sequence of planning and production that will result in the new instructional system. The special chart is called PERT (Program Evaluation and Review Technique). Refer to Appendix 9, which indicates a **time line** at the top of the chart. What is the **critical path** on the time line if the critical path is the shortest possible time the project can be completed when the subcomponents are combined in the most efficient manner as indicated by the chart? (_____)

* *

116 days (Note the formula for arriving at the estimated times that the various processes will take between events.)

32. The biggest single problem in undertaking instructional development, especially in a school which has the characteristics of a closed system, is overcoming the inertia of stagnation. One of the most common management techniques or models which is resorted to by a determined (and usually new) administration is a **militaristic model.** From the name, you can guess that the militaristic model is described by which of the following:

    a. The faculty generates instructional alternatives which are then evaluated and approved or modified by the administrator.

    b. The faculty, students, and administration work together with some help from community sources to establish policy and evaluate instructional alternatives.

    c. The administration establishes policy "guidelines" through which the faculty can develop instructional alternatives.

* *

c – the militaristic model

b – the systems approach being developed in this Institute

a – a "perverted" kind of militaristic model in which faculty can be made to feel threatened or intimidated by the administration. This model narrows instructional development to activities which will "please" the administration, but which may reflect little influence from actual environmental needs.

33. The militaristic model (and its variations) are usually undertaken in good faith by administrations who are attracted by its apparent efficiency. At this point in your developing systems knowledge, you should predict which of the following will be a typical faculty reaction to the militaristic approach:

    a. Defensive
    b. Polarization
    c. Rapid advances in innovative instructional practices
    d. Increases turnover of personnel (including competent personnel).

* *

a, b, and d.

34. Later, you may wish to refer to Appendix 10. This Appendix has been included as a sequence to be considered during your DEFINE phase. Like everything else

in this sequence, of self-instruction, the appendixes are simply suggestions and tools. The creative problem-solving behavior, which will enlist tools in the cause of successful instructional development and the enhancement of human values, is an input that can only be provided by (_____).

* *

ME! (**not** "they"!)

GUIDEPOST #10

This concludes the programmed sequence of self-instruction. It was designed to present to you, and to assist you in understanding the need for the activities associated with the first stage (DEFINE) of the three-stage instructional development model.

The first three units comprising Stage I include: Identification of the Problem(s), Analysis of the Setting, and Organization of Management.

Unless you intend to become a full-time instructional development person, it is **unimportant** that you remember the jargon which has been used as a **means** to develop these **ideas.** One of the most inhibiting effects in instructional development is to quarrel over the "meaning" of definitions. **"Meanings" are in the images of people, not in dictionaries or in definitions!**

The purpose of the program has been to give you an **analytical framework** for accounting for the **functional relationships** attendant to instructional development activities, as modified by the various **human factor** considerations. You should be more sensitive to the multi-fold complexities which are attendant to genuine instructional development activities and the potential of such activities for your students.

The purpose of the Appendices of the program is to provide you with reference material when you become involved in instructional development as part of your professional responsibilities.

The SMI and IDI staff hope that you have found the substantial expenditure of energy required in working through this program justified by the potential applicability and relevance of the program information in assisting your professional career.

A Post test follows which may be used as a summary review of the self-instructional program. If you score 90% or better, you are to be congratulated on having done a thorough job of preparation.

PART 4– STAGE 1: DEFINE

Post Test

Use this summary as a test or as a later review of the important principles studied in the program.

1. The three functions of the first stage of instructional development which you have studied are (_____), (_____), (_____).

* *

definition of the problem
analysis of the setting
organization of management

2. An analysis of the total school setting provides the following data:

   a. Most of the faculty are past 50 years old.

   b. Young faculty, when hired, leave after one or two years.

   c. Systematic instructional development and voluntary instructional development are at a low level.

   d. There is increasing community pressure in regard to a lack of "relevance in the courses offered."

   Based upon those data, you should suspect that the school is more likely to be (an open, a closed) system.

* *

a closed

3. As a change agent in such a school, if you approach the staff on the basis of confronting them with community criticism, you can expect that the **most appropriate** response for the staff will be (problem solving, defensive, neurotic) behaviors.

* *

defensive

4. In developing a program of analysis in a school which is essentially a closed system, you can expect that which life style will probably predominate?

   a. innovator
   b. middle adopter
   c. later adopter

* *

later adopter

5. As a change agent in any school system, you can increase your probability of success by concentrating your attention on which of the following:

   a. innovator
   b. middle adopter
   c. late adopter
   d. decision maker
   e. opinion leader

* *

opinion leader

6. Which of the following persons will be most amenable to logical or rational considerations and still maintain stable relationships with associates:

   a. innovator
   b. middle adopter
   c. late adopter
   d. decision maker
   e. the neurotic personality

* *

middle adopter

7. "Information" is defined as (_____
   _____).

* *

Input of data or sensory perceptions into a system from outside, which serves to **reduce uncertainty** about the state of the outside systems and **make it more predictable**.

8. A person who exhibits defensive behaviors is a (_____) system who tends to reject (_____) about the outside world when it conflicts with his image

* *

closed
information

9. Unless you conduct a systematic analysis of the setting as a part of your definition of the problem, you may confuse (s_____) with (p_____)

* *

symptoms
problems

10. **Systems dissonance** is caused by which of the following:

    a. A poor functional relationship between subsystems.

    b. More than one person being assigned a responsibility.

    c. A steering committee whose members serve as a part of other developmental committees.

* *

a

11. A common source of systems dissonance which is not attributable to a functional relationship may be attributable to the (_____).

* *

human factor

12. Selective perception of the same referrent situation (i.e., an observed instructional problem) may be due to (_____ _____).

* *

a difference in the obeserver's respective images

13. In order to effect meaningful and lasting instructional development, the diverse images that exist among the staff must be combined so as to reflect (_____).

* *

an ideal

14. The most difficult condition to overcome that can develop in a school system when instructional development tactics are carelessly organized, or when analysis and problem definition are inefficiently done, or when human factors are overlooked, is a condition known as (p_____).

* *

polarization

15. Polarization exists where different groups representing conflicting (_____) have become (_____) systems in order to resist the input of incompatible information.

* *

ideals
closed

16. An efficient approach toward managing instructional development consists of accounting for what four basic functions of organization:

(_____) (_____)

(_____) (_____)

* *

a. steering
b. design
c. development
d. operation

READ THE FOLLOWING DETAILED DESCRIPTION OF A SCHOOL SITUATION AND ANSWER THE QUESTIONS WHICH FOLLOW.

Both functional factors and the human factor, which may be labeled "personality conflicts", must be considered when conducting instructional development. Suppose you had been hired as an Instructional Development Consultant to correct problems in Local School. You did such a good job that you have been hired as Principal of Adjacent School. You are told "The place is a problem area and has become unresponsive to the expressed needs of the community." Your assignment has been to bring about appropriate changes. As you begin collecting data to define the problem and analyze the school setting, the following information emerges.

Mr. Blarney had been assigned by the previous principal to develop a sequence of programmed instruction for a self-tutorial approach to the study of ecosystems in the school's biology curriculum. Blarney comes highly recommended as an arranger of programmed instruction, but is not a biologist and is unaware of general systems theory.

Mr. Kaliber is the biology teacher, who is uninformed about current instructional alternatives, but is well-steeped in and has been successful in applying the methods he learned during World War II.

Kaliber has insisted that he fill some capacity as information presentor for the students; he rejects Blarney's recommendation that he serve a modified role as information arranger and counselor and leave the "nitty-gritty" to the programmed sequences.

No provisions had been made by the former principal for conducting the instructional development, other than assigning Blarney to Kaliber.

The result of the Instructional development project to date is as follows:

1. A system has been designed with some self-tutorial sequencing, but all students must personally interact with Kaliber to have each new key concept explained by him.

2. The program appears to be little more than a laboratory exercise. A "log jam" develops at each point where Kaliber is to "do his thing."

3. Students who finish the self-tutorial program first, have to await Kaliber's explanation of the subsequent procedure before they can continue.

4. Students who are slow, rush the procedure to hear Kaliber's explanation of the subsequent procedure with the result that their marginal performance on the first procedure is prelude to disaster on the subsequent ones.

5. Overall student performance has dropped from the comparatively low level it was originally (comparisons are made against state exams).

6. Angry letters from parents have reached the superintendent's office, and the president of the school board has dropped in to find out, "What in hell is going on down there? "

Interviews with the staff have produced the following representative statements:

1. 1. Kaliber states that the "meddling" of the Systems Designer (that's the title Blarney wears) is the basic problem because of Blarney's insistence that the students work by themselves with procedures which Kaliber claims the student's "don't understand." He says, "Before, I provided all of the explanation and supervision a small step at a time and there were no problems and

the kids did better. It was only when Blarney **forced** me to let the kids try to do all of those things themselves that there were problems. If you think their grades were bad before, look at 'em now!"

2. Blarney says that both student performance and morale were low before the new system was designed. He claims that the kids learned a lot of rote behaviors that they didn't understand. This caused them to **look** like they knew what they were doing, but they could not think or act creatively or independently. Thus, they did poorly on the state exams. The problem, according to Blarney, is ". . . the hard-nosed attitude of Kaliber in his staunch refusal to let me do what I **know** can be done!"

3. The students report that there is "Total chaos, man, like way out!" They didn't know what was expected from them. They said that what Kaliber said conflicted with what the program taught. They said that the **safest** thing to do was to forget what the program said and listen to Kaliber since he ". . . wields the heavy red pen."

4. The teachers are divided in their perception of the problem:

   Group A (40% of the faculty) is represented by Miss Gloat. Miss Gloat claims that Mr. Blarney is "arrogant and overbearing" in his approach to the faculty and that he "thinks he knows all of the answers." She reports that Kaliber is a dedicated professional, "if not the best biology teacher in the world." Miss Gloat's group believes that the real problem is that Blarney did not help do what Kaliber knew was best in teaching biology . . . "and as you can see, Blarney has forced Kaliber to try to do something which has **clearly** proved to be **unworkable!**"

   Group B (10% of the faculty) is represented by Miss Brater. Miss Brater states that "Kaliber's mind stopped recording twenty years ago, and has been in playback ever since!" Her group claims that Blarney is competent and imaginative and that the idea would have worked if it had been **tried.** They claim that the real problem lies in the fact that the previous principal, Mr. Copout, did not **order** Kaliber to comply with an acknowledged expert's recommendations, and to see to it that the new system had a fair chance.

   An analysis of credentials shows that Kaliber has had a fair record of success during his long tenure at Adjacent School. Mr. Copout had hired Mr. Blarney on the basis of a strong academic record and excellent recommendations, in spite of a lack of experience. The records show that Mr. Copout had purchased a substantial amount of equipment for the new system, on the recommendation of Mr. Blarney, which now sits idly gathering dust on the biology lab shelves, and in other storage areas where loud compliaints have arisen about it being "in the way."

17. Given the above preliminary evidence, your next move should be to make a preliminary identification of the (_____).

* *

problem(s)

18. The statement of Mr. Kaliber is an example of (_____) behavior.

* *

defensive

19. The statement of Mr. Blarney is an example of (_____) behavior.

* *

defensive This is also defensive behavior because it **narrows** on his own perception of the problem rather than consisting of an objective statement of facts and data and the inclusion of wider-ranging factors which bear upon the problem.

20. What typical **life styles** are most likely as expressed by Miss Gloat and Miss Brater?

Miss Gloat _____

Miss Brater _____

* *

Late adopter
Innovator

21. From the information, provided, list at least four **symptoms** of the basic problem.

1. (_____).
2. (_____).
3. (_____).
4. (_____).

* *

a. Kaliber and Blarney are not talking **with** each other; they are talking **at** each other.

b. There is polarization among the faculty.

c. There is negative feedback to parents as to what is going on in the school.

d. The students are confused in knowing what is expected of them.

e. Student performance in biology is and was below the state norms.

f. Poor student morale became worse with the installation of the new program.

g. There is a "log jam" as students move through the instructional sequence.

h. Personnel records show that there is at least a basic competence in each of the "combatants" which is inconsistent with their performance.

i. The hardware is not being used and is a source of irritation to some of the other faculty.

22. What percentage of the total school faculty would most likely fall in the middle adopter category? (_____%__)

* *

100% – (40% + 10%) = 50%

23. In proposing to conduct additional instructional development in this school, your first task should be to identify and get the support of the (_____).

* *

opinion leaders

24. Given the alignment of faculty as indicated by their statements, you would have to classify this school as basically a (_____) system.

* *

closed (40% late adopter types is **high**).

25. This is the last question. Write a **detailed** memorandum to the superintendent on your preliminary analysis of the problem and what you propose to do about it. In your description, analysis, and proposals, **use the systems concepts you have been learning throughout this self-instructional program.**

Write your answer here or on a separate sheet.

* *

YOUR STATEMENT TO THE SUPERINTENDENT SHOULD HAVE INCLUDED MOST OF THE FOLLOWING POINTS:

Analysis:

1. No clear and definitive statement of the problem can be made at this time. Only preliminary and tentative assessments can be made, pending subsequent detailed analysis.

2. One basis for the problem seems to lie in the administrative practices and policies in the school. (Symptom: the manner in which the assignment of Blarney to Kaliber was made.)

3. The school may have characteristics more like that of a closed system in so far as contemporary teaching methods are concerned and in so far as the school's response to the community is concerned. (Symptom: teachers' polarization.)

4. The approach to instructional development undertaken by Blarney was a unilateral approach and at best a bilateral approach (Blarney-Kaliber); by no means was it a systems approach.

5. Consistent with what systems theory would predict about the nature of such a unilateral approach or a **nonsystems approach**, the following considerations were overlooked or underestimated by Blarney and the administration:

   a. There was a threatening situation created for much of the faculty by Blarney's activities. ("When Blarney finishes with Kaliber, I may be next!")

   b. There was no provision made to include community input, nor even communicate with them about proposed curriculum changes. (Symptom: parental input, when it came was negative criticism, was directed at the superintendent, and showed an absence of information as to what was happening.)

   c. There could not have been testing and evaluation of the new system as per the results turned out, nor were modifications attempted.

   d. There was no accounting for the effect, or perceived effect, the new system would have upon other instructional systems in the school.

   e. Many considerations were, in general, overlooked as the result of a lack of analysis on a systems basis. These include:

      (1) The effect of the existing polity structure on design and development.

      (2) Kaliber's life style and decision-making characteristics.

(3) Student perceptions of their part in the system, and the role of their system.

(4) Perceptions, life styles, and decision-making characteristics of the other faculty.

(5) The implications of the new system to the total physical plant.

(6) Negative assumptions were made as to the **competence** of personnel by other personnel, and were allowed to continue to exist when there was no base in fact, nor was there any provision for correction of these distorted images as a normal part of systems design.

(7) There were problems with basic functional relationships and these were aggravated by an almost total neglect of considerations relating to the functioning of the **human factor.**

(8) There was regular use of symbol-based emotionally loaded terms rather than perceptually based descriptive terms.

Proposed solutions:

1. More systematic definition of the problem and analysis of the setting.

2. Enlistment of faculty support beginning with opinion leaders.

3. Identification of systems and subsystems.

4. Establishment of policies and procedures which would permit information transfer among the systems.

5. Inundation of the total school system with information from systems which are external to the school, such as Universities, consultants, visiting specialists, reading programs, film programs, displays, and sending staff to visit other locations.

6. Establishing of lines of communication with the community and among all of the defined systems.

7. Systematic communication with extensive provisions for feedback from students into the instructional process.

8. Systematic consideration of the functioning of the **human factor** in every phase of the various functional relationships.

APPENDICES

APPENDIX 1

List of subsystems to be considered during instructional analysis:

A. **Physical Systems**

1. Budget (Dollars)
2. Physical Plant (includes)

    a. Space allocations
    b. Hardware
    c. Services
    d. Flexibility

3. Type and number of "talent"
4. Community Resources

B. **Communication Systems (information grids)**

1. Administrative Policies
2. Curriculum Philosophy
3. Classroom Management Styles
4. Interpersonal Communication Styles of **Groups** (subsystems)

    a. Students
    b. Faculty
    c. School Administrators
    d. School Board
    e. Parents
    f. Community Leaders (decision makers)

NOTE: Each of these subsystems can be broken down even further into smaller subsystems.

"Acceptability" of any proposed definition of a problem, and an associated proposed solution, will depend upon the skill with which the subsystems are first defined, analyzed and then managed.

APPENDIX 2

Characteristics of Persons Correlated with Life Styles*

A. The Innovator (or person most willing to adopt an innovation early):

1. Has more intelligence.
2. Has more education.
3. Travels more.
4. Is more active socially.
5. Is more likely to seek out change agents.
6. Has more contact with media.
7. Has greater exposure to interpersonal communication channels.
8. Has higher social status.
9. Is upwardly mobile.
10. Is less fatalistic.
11. Will accept greater risks.
12. Can cope better with abstractions.

B. Change Agent Success is Positively Correlated With:

1. His having more education than his clients.
2. Being client centered rather than innovation (or agency) centered.
3. The degree he is perceived similar by his clients.
4. The extent he works with and gets the support of opinion leaders.
5. The more open he is to information input from diverse sources.
6. How well he can empathize with his clients.
7. The extent of his credibility in his client's perception.
8. His client's ability to evaluate the innovations.
9. How compatible the innovation is with the needs of his clients.
10. How hard he works at diffusing the innovation.

C. **Innovations are More Likely to be Adopted (and not discontinued) If:**

1. The innovation is diffused through a participative approach rather than an authoritative approach.

2. Those who are the "legitimizers" (give the official okay) have higher social status than the other members of the system.

*These general obeservations are considerably elaborated in Diffusion of Innovation by Everett M. Rogers, The Free Press, New York, 1962. A new edition will be available this year.

3. There is an element of compatibility in the innovation with some element of the status quo (i.e., image compatibility).

4. The clients can perceive the relative advantage of the innovation.

5. The group norm is change oriented (i.e., if the system is inherently open).

6. The system permits a high level of information transfer within it so that administrators are supportive of their personnel.

7. The "power elite" support the innovation.

8. A majority of the clientel have adopted the innovation for reasons of satisfaction.

APPENDIX 3

Some Considerations in Regard to Analysis of the Instructional Setting

You will be analyzing the instructional setting so as to partition it into relevant subsystems in order to see their effect upon the learner. Your analysis of the various systems should include asking questions similar to the following:

A. **What are the Characteristics of the Learner?**

1. What is his physical health.
2. What is his mental stability and emotional health.
3. What is his history of achievement.
4. Who are his heroes, his villians?
5. Who are his friends, his enemies?
6. What are his favorite activities, his unfavorite activities?
7. If he is "lazy" what is he doing when he is "lazy? "
8. Is there variability when his behavior in one instructional setting is compared with another instructional setting?
9. Is there variability in his behavior when it is compared with the instructional setting and outside the instructional settings?

B. **What are the Characteristics of the Educational Personnel?**

1. What are the capabilities of the staff in regard to their interactions with the learner? (In systems theory you cannot consider ability out of context.)
2. What is the nature of the interaction of the staff with the learner?
3. How much time does the staff spend with the learner?
4. What are the competing demands upon the staff time that require them to be away from the learner?
5. How do answers to these questions compare when they are asked of:

a. Faculty in differing instructional settings
b. Specialists

6. How are interactions between faculty and specialists and among the various faculty **perceived by the learner**?

7. How are the characteristics of educational personnel as revealed by answers to the above questions a function of current administrative policies?

C. **What are the Characteristics of the Community?**

1. What are parents' attitudes toward the learner? The school?

2. Are community attitudes similar to the school environment? Do they specify similarities and differences in relation to the behavior of the learners? (Are systems open or closed)?

3. Are learning activities and behaviors of the student outside of the school similar to or different than the behaviors expected of the student within the school? (i.e., you are looking for explanations of potential or existing systems dissonance?)

4. Are community resources an integral part of the school resources, or are they used randomly rather than by design by the students and staff? These community resources might include:

a. An airport, train or bus terminal
b. Industry
c. Medical center
d. Political and legal centers
e. Cultural institutions including libraries and theaters
f. Sports centers
g. Prominent individuals

5. Are the avocation activities of the staff markedly different from the avocation activities of the community in general and the student's parents in particular.

D. **What is the Nature of the Body of Knowledge?**

1. Is the curriculum directly related to community values, or is it superimposed over community values?

2. Does curriculum practice reflect an advanced contemporary or retarded state of the art in comparison to acknowledged leaders in different parts of the country?

3. Is there a systematic plan for continual curriculum revision? If so, can you describe the input-output interfaces in regard to the information income and outgo? The interface should **not** filter or edit incoming information.

4. Is the curriculum content structured in such a way that the **learner** can perceive its relevance to his own image of the world?

5. Could you predict and verify that the learner will be able to function more effectively in society now and for the next twenty years as a result of that curriculum?

E. **What is the Nature of School Physical Facilities and Instructional Materials?**

1. Is the assignment of space to instructional projects **flexible and responsive** to demonstrated needs?

2. Is the major criteria for purchase of instructional media and associated support supplies more a function of existing budget, or it is more a function of analysis and demonstrated need?

3. Is quality or price the first consideration in the purchase of instructional media? How does the answer to this question figure in the nature of the instructor-student-media systems interactions?

4. Are instructional aides routinely purchased by policy directives or by the instructor who will use them?

5. Is the school geared to generate **its own** instructional aides and media support or is such support routinely purchased from commercial suppliers?

6. Are assignment of physical facilities done in such a manner as to set up what might be called "territories" to be jealously guarded and defended in feudalistic tradition, or is there a free and easy give and take such that space assignments are in constant flux depending upon demonstrated need?

7. In looking at the contents of the library and media center, are they equipped to instantly or quickly and efficiently respond to the demands of nuclear-electronic world of incredible social change? Are they conveniently located?

F. **What are the Systems' Relationships Between and Among the Five Preceding Areas of Investigation?**

1. Is the school an open or closed system with respect to the community?

2. Is there polarization among various faculty groups? With respect to what?

3. Who are the opinion leaders and what are their relationships to each of the above factors?

4. Within the school staff, are political considerations or instructional considertions the ultimate criteria for decision making?

5. Is the curriculum open or closed with respect to learners, staff and community and world events?

6. How do each and every one of the above factors itemized in this appendix bear upon the **learner behaviors** at issue in the instructional system being questioned?

APPENDIX 4

Sources of Information in Defining the Problem and Analyzing the Setting

A. Admission Requirement:

1. Colleges and universities
2. Trade schools
3. Industry
4. Commerce
5. Social institutions

B. Community:

1. Records
2. Media
3. VIP's (Decision makers) Including school board members and PTA
4. Reports and need projections

C. Parents:

1. Employment records
2. Government records
3. Questionnaires
4. Children's reports and evaluations
5. Surveys by school officials
6. Kind and amount of initiative and overtures made toward the school

D. Staff:

1. Academic records
2. Employment histories
3. Avocations
4. Community interests and involvement
5. Professional involvement
6. Classroom philosophies
7. Opinions of students
8. Performance of students
9. Opinions of associates
10. Opinions of nonprofessional associates
11. Expressed opinions via questionnaire and interpersonal communications.

E. Students:

1. Emotional tests
2. Academic records
3. Vocational tests
4. Sociograms
5. Opinions of teachers, peers, parents, community residents
6. History of classroom and school behaviors
7. Avocation
8. Behaviors in different social environments
9. Attitude scales
10. Autobiographic materials
11. Interviews and observation

APPENDIX 5 Needs Assessment Form

Prepared for the
National Special Media Institute

by

Diana Caput
Arlene Magnus

Produced under a grant from the U.S. Office of Education, Bureau of Libraries and Educational Technology, Division of Educational Technology, Media Specialist Program. © Copyright National Special Media Institute, 1971.

DISTRICT/SCHOOL INFORMATION SHEET

Description of Use

The information sheet was developed for the purpose of collecting needed data on school district or individual schools. Since such information on the Instructional Setting of a school is collected for a specific purpose, only those categories of concern are completed by the school. This information sheet is simply an extended listing of the types and categories of information one may desire about a school.

SUGGESTIONS FOR USE
if Information is not obtained through Personal Interview

1. Check in red those categories and items for which information is needed. Circle "district" or "school" where appropriate.

2. Write in red titles of specific kinds of tests, kinds of equipment, etc. about which information is desired.

3. Instruct those ASSIGNED to completing the form that they should use existing school records wherever possible. If the information is not available, a qualified person in a position to make a knowledgeable estimate or judgment can do so. **APPROX** should be written next to that response.

4. If the source is other than school records, the person and his position should be noted.

PERSONS CONTACTED in school or district as sources of information, such as business manager, attendance officer. Supt., principal, counselor, should be **INDICATED** on a separate record.

DISTRICT/SCHOOL INFORMATION SHEET

District Data Collection

i. General Information:

A. _____
(District's Name)

_____
(Address) (Phone)

B. _____
(Type of District)

C. Financial Information

1.	Assessed valuation/ADA (k-8)	
2.	Assessed Valuation/ADA (9-12)	$ _____
3.	Tax rate (per $100 assessed valuation)	$ _____
4.	Per pupil expenditures	$ _____
5.	Special Project Funds (Gov't., private) (Please specify, e.g., ESEA, Title III, etc.)	$ _____
	_____	$ _____
	_____	$ _____
	_____	$ _____
6.	Total Budget	$ _____

D. Size of District (or School)

Type of School	NR. of Schools	Total Pupil Enrollment at Level Indicated
K-6	_____	_____
K-8	_____	_____
7-8	_____	_____
7-9	_____	_____
9-12	_____	_____
10-12	_____	_____
Jr. College	_____	_____
Other (Specify: _____)	_____	_____
Total Pupil Enrollment in District		_____

II. Personnel:

A. **Professional Personnel** — **NR. of Personnel**

1. Fully Certificated Teachers

   a. Full time — a. _____
   b. Part time — b. _____

2. Non-Certificated Teachers:

   a. Full time — a. _____
   b. Part time — b. _____

3. Certificated Personnel (Not Teaching, e.g., Head Counselor, Principal, Librarian, etc.):

   a. Full time — a. _____
   b. Part time — b. _____

B. **Non-Certificated Personnel**

1. Total Non-Certificated Personnel:

   a. Full time — a. _____
   b. Part time — b. _____

2. Clerical Work:

   a. Full time — a. _____
   b. Part time — b. _____

3. Maintenance:

   a. Full time — a. _____
   b. Part time — b. _____

4. Para-professional (e.g., Teaching assistants, aides, technicians, etc.):

   a. Full time — a. _____
   b. Part time — b. _____

5. Volunteer (average hours per/ week: _____)

C. **Personnel Statistics (if % not available specify numbers)**

		NR. of Personnel
1.	Teacher/Pupil ratio	1._____
2.	Teacher/Specialist ratio	2._____
3.	Teacher/Supervisor ratio	3._____
4.	Teachers transferring to other schools within district (specify average number per year)	4._____
5.	Teachers leaving district (specify average number per year)	5._____
6.	Teacher age range	6._____
7.	Average age of teachers	7._____
8.	Administrator age range	8._____
9.	Average age of administrators	9._____

III. Pupil Information:

A. **Drop-Out Rate**		**Approx. NR Per year**	**Approx. % Per Year**
1.	For District	1._____	1._____
2.	For School Specified:_____	2._____	2._____
3.	For Grade Level Specified:		
	a._____	3. (a)_____	3. (a)_____
	b._____	(b)_____	(b)_____
	c._____	(c)_____	(c)_____

B. **Average Daily Attendance**			
1.	For District	1._____	1._____
2.	For School Specified:_____	2._____	2._____
3.	For Grade Level Specified:		
	a._____	3. (a)_____	3. (a)_____
	b._____	(b)_____	(b)_____
	c._____	(c)_____	(c)_____

C. **Transfer Rate**			
1.	For District	1._____	1._____
2.	For School Specified:_____	2._____	2._____

Transfer Rate	Approx. NR Per Year	Approx. % Per Year
3. For Grade Level Specified:		
a. _____	3. (a) _____	3. (a) _____
b. _____	(b) _____	(b) _____
c. _____	(c) _____	(c) _____

D. **Tardiness**

1. For District	1. _____	1. _____
2. For School Specified: _____	2. _____	2. _____
3. For Grade Level Specified:		
a. _____	3. (a) _____	3. (a) _____
b. _____	(b) _____	(b) _____
c. _____	(c) _____	(c) _____

E. **Racial Survey**

	In District NR.	%	In School Specified NR	%
1. Black/Negro	1. ___	___	1. _____	_____
2. Caucasian/White	2. ___	___	2. _____	_____
3. American-Indian	3. ___	___	3. _____	_____
4. Mexican-American	4. ___	___	4. _____	_____
5. Oriental	5. ___	___	5. _____	_____
6. Other (Specify _____)	6. ___	___	6. _____	_____

F. **Ability and Achievement (including Measurement Instrument Used and Score Average)**

	Name of Test Instrument	Average Score
1. I.Q.		
a. For district		a. _____
b. For school specified		b. _____
c. For grade levels specified		c. _____

	Name of Test Instrument	Average Score
2. Reading		
a. For district		a.
b. For school specified		b.
c. For grade levels		c.
3. Math		
a. For district		a.
b. For school specified		b.
c. For grade levels specified		c.

B. Equipment

	Type	NR.	Available For Use	*Condition	Comments: Durability, Maintenance, Replacement, etc.
1.					
2.					
3.					
4.					
5.					

*Indicate: 1 = Very Good, 2 = Adequate, 3 = Poor

C. Facilities

	Describe Types Needed	Purpose	Spaces Available	*Condition	Nr. of People
1.			a.		
			b.		
2.			a.		
			b.		
3.			a.		
			b.		

*Indicate: 1 = Very Good, 2 = Adequate, 3 = Poor

D. **Environmental Conditions**

Space Description: Facility or Room Name or Number	Purpose or Primary Use	Furnishing	*Lighting Control	*Temperature Control	*Noise Control
1.					
2.					
3.					

*Indicate: 1 = Very Good, 2 = Adequate, 3 = Poor

V. Community Characteristics

A. **Description of Community** (check which type, including %)

1. Urban _____
2. Suburban _____
3. Rural _____
4. Industrial _____
5. Military _____
6. Commercial _____

B. **Types of Residents** (approx. %)

1. Home Owners ___%
2. Home Renters ___%
3. Apartments ___%
4. Mobile Homes ___%
5. Others ___%

C. **Racial or Ethnic Composition of Community**

Black/Negro _____ %
Mexican/American _____ %
Caucasian/White _____ %
Oriental _____ %
American Indian _____ %
Other _____ _____ %

D. **Language Composition** (specify number or % of students):

	Language Spoken in the Home	Only Fluent Language Spoken by Child
English		
Spanish		
French		
Japanese		
Chinese		

E. **Average Family Unit Size**

Number of members _____

F. **Average Level of Income** (of families in District)

1. $1,000-$3,000 _____ %
2. $3,000-$5,000 _____ %
3. $5,000-$7,000 _____ %
4. $7,000-$_____ _____ %

G. **Average Level of Education** (approximately highest grade completed)

1. Parents _____
2. Siblings _____

H. **Types of Employment** (by %)

1. Executive _____ %
2. Professional _____ %
3. Managerial/Supervisory _____ %
4. Proprietor _____ %
5. Technicians _____ %
6. Skilled White Collar _____ %
7. Skilled Manual Workers _____ %
8. Semi-Skilled Manual Workers _____ %
9. Unskilled Manual Workers _____ %
10. Unemployed _____ %
11. Other _____ _____ %

I. **Family Information**

1. Religious Affiliations

   a. Catholic _____ %
   b. Protestant _____ %
   c. Jewish _____ %
   d. Other _____ %

2. Political Affiliations

   a. Democratic _____ %
   b. Republican _____ %
   c. Independent _____ %
   d. % of Qualified voters who are registered _____ %
   e. % of registered voters who participated in last municipal election _____ %

3. Other Affiliations of Relevant Activities

   a. _____
   b. _____
   c. _____

J. **Special Community or Family Problems**

1. _____
_____
_____
2. _____
_____
_____

K. **Mobility** (specify % or Number)

1. How long does the average family stay in your district/school? _____Years

2. Describe any pertinent information relating to the mobility or stability of the community. _____
_____
_____

L. **Geographical Setting**

1. Location: _____
_____

2. Environment in general: _____
_____

M. **Other Types of Information that might be Considered**

1. Demographic Data

a.	Population Size		_____%
b.	Population Density		_____%
c.	Marriage and Divorce Rate		_____%
d.	Birth and Death Rate		_____%
e.	Age Distribution	(1) 0-10	_____%
		(2) 10-20	_____%
		(3) 20-30	_____%
		(4) 30-40	_____%
		(5) 40-50	_____%
		(6) 50-60	_____%
		(7) 60-70	_____%
		(8) 70 +	_____%

2. Major Institutions & Organizations of Community (name)

a. Government/political _____
b. Educational _____
c. Religious _____
d. Service _____
e. Social _____
f. Labor _____
g. Professional _____
h. Recreational _____

3. Socio-economic Stratification

a. Upper-Upper _____ %
b. Upper _____ %
c. Upper-Middle _____ %
d. Lower-Middle _____ %
e. Lower _____ %
f. Lower-Lower _____ %

P. **Other Information**

_____

_____

_____

_____

APPENDIX 6 Selection of Media Tools by Means of Systematic Criteria: A Mini Example of Instructional Development

ASSUMPTIONS*

There is an unlimited amount of money and time available. Without such an assumption, it is possible to cheat one's self of even the knowledge of what an optimum system of instruction might be, toward which one can work as money, time and staff become available. For example, if one first asks "What can we get for $10,000?" the outcome is immediately biased by a question which has nothing to do with instructional **needs.** Of course, you will eventually have to meet some kind of budgetary constraint.

There is in existence a rigorously defined sequence of instructional objectives (studied during Stage II of the model), which are written in behavioral terms (i.e., "What will the student be **doing** . . .").

The entry behaviors of the student participants have been carefully defined for the instructional system to be designed.

The unit of analysis (in this example for each unit of the instructional sequence is based upon individual students rather than groups of students (such as a class).

Acceptance of the Whorf-Saphir hypotheses. This hypotheses states, in effect, that unless a real world phenomenon has been **labeled** and given verbal or abstract symbolism, the phenomenon is non-existent or invisible to the beholder. For example, consider the clothes you are wearing at the moment. Unless you have developed a certain specialized verbal hierarchy, you probably are not aware if you are wearing a polyester, double-knit jacquard structure cut on the grain with general mill finishes plus durable press, let alone discuss marketing and economic implications of such structures in comparison to 100,000,000 other possible clothing structure alternatives.

This model is necessarily simplistic and abbreviated, and represents only one kind of a model which might be created.

*Each of the assumptions are created for the purpose of this exercise, which is included in order to provide you some kind of a frame of reference for collecting and analyzing data, and for establishing priorities. You will be studying, in detail, a complimentary model later in the Institute.

MATCHING THE ENVIRONMENT WITH A STUDENT'S ENTRY BEHAVIOR

1. "Environment" in this case is defined as the relation of the instructional system to the student. The instructional system or environment includes all media (including teachers, peers, adults) which support or interfere with the student's attainment of the instructional objectives.

2. Refer to Figure 1 (on pages 3 and 4).

3. The abstraction level of the student is determined as a result of the entry behavior analysis of the student.

4. Notice that in Level 5 (top row) in Figure 1: selecting a student environment consisting entirely of a lecture makes the assumptions stated in the six preceding columns (i.e., the student has a high level of abstraction, complete mastery of verbal symbolism, etc.)

5. Consider the implications of inadvertently matching a student with entry behavior consistent with Level 1 (low) with a media presentation consistent with Level 5. The student, the teacher and the other students who may be at Levels 4 or 5 will compete for maximum frustration.

6. Any instructional environment will actually consist of some kind of a mix of all five levels of media, but the dominant media form should be consistent with the individual student's level of abstraction ability.

7. A sequence of mediated instruction should be developed, which progresses from the student's entry behavior through to the exit behavior established by the sequence of objectives set for the instruction.

8. Before finalizing the sequence, an analysis of the factors presented in consideration with facilitating student behavior in the instructional environment and will suggest what modifications of the factors presented in above might be desirable.

ABSTRACTION LEVEL	A SYMBOLIC LEVEL	B PERCEPTION LEVEL	C STIMULUS ACCEPTABLE TO LEARNER
5. High	Complete mastery of verbal symbolism, principles and details	Complete and accurate perception of relevant perceptual phenomenon. Total differentiation and integration.	Verbal (written) symbolic expression
4. Medium high	General mastery of verbal symbolism, fundamental principles understood, but details missing	Minor distortion of perception, distorted perception of detail. Faulty differentiation.	Iconic representations
3. Intermediate	Fundamental principles partly understood, details partly missing, vague and/or partly confused	General perception of environmental phenomenon. Detail and integration of total perceptual phenomenon distorted.	Dramatization demonstrations.
2. Medium low	"Layman's" awareness, basic principles partly confused or missing, little detail present and is distorted.	Considerable distortion of all relevant perceptual phenomenon. Faulty integration.	Contrived experiences and simulations.
1. Low	No useful symbolism, basic principles non-existent, details unrelated	Phenomenon invisible and/or unrecognized by the student	Documentation and directed real world experience
ABSTRACTION	D ORGANIZATION LEVEL OF PRESENTATION	E MEDIA CHARACTERISTICS	F TYPE OF MEDIA
5. High	Random organization tolerated by the learner.	Symbolic (Verbal, written) presentations and interactions.	Lectures. (Textbooks) Discussions.
4. Medium high	Filling in of detail in relation to whole is needed.	Graphs. Charts. Picture language.	Chalkboards. Overhead transparencies. Slides Photographs.
3. Intermediate	Sequential ordering with detail applied toward that end. Emphasis on applied details is needed.	Schematic diagrams. Documentation through recordings (sound and picture).	Audio-tape (reels and cassettes). Motion picture film. Television.
2. Medium low	Sequential ordering of basic constructs with emphasis on detail in relation to the whole is needed.	Constructed structural representations. High level of detail included. Accurate (high fidelity) representations of reality	3-D models displays. Instructional games and simulation.
1. Low	Complete direction for developing sequential understanding and labeling of basic structure is needed.	Participation as observer in contact with real world action and events. Directed observation and/or participation.	Laboratory experience. Field trips. Directed "hands-on" experience. Apprentice relationship.

FIGURE 1

FACILITATE STUDENT BEHAVIOR IN THE INSTRUCTIONAL ENVIRONMENT

ASSUMPTIONS

The basic function of the instructor at all levels is **not** that of "presenter".

The instructor serves the basic function of designer, consultant, coach, arranger and friend.

The instructor will always design the instructional system such that the student's performance is under his (her) direct or indirect obeservation.

ARRANGING THE ENVIRONMENT FOR LEARNING

Based upon completion of the objectives and the analysis conducted under Phase I as to what the student will be doing when the sequence is completed, arrange for some kind of student-environment interaction, by accounting for the following questions:

Do the behavioral tasks for the instructional unit amount **only** to a student interaction with the non-human environment such as operating a piece of machinery or identifying, differentiating, integrating or manipulating some feature of the environment **without** interaction with another person?

If "yes", go to #3

If "no", go to #1.

1. Does the behavioral task include interaction with one or more other individuals in **addition to** manipulation of the non-human environment?

   If "yes", go to #4

   If "no", go to #2.

2. Does the student interaction **exclude** all features of the non-human environment but include interaction with one or more other human beings?

   If "yes", go to #5

   If 'no', re-evaluate your analysis. The student's task must fall into one of the three preceding rubrics.

3. Provide the following for the student:

   a. A secluded environment in which the student can proceed from "A" to "Z" undisturbed at his own pace.

b. Arrange all necessary tools, materials and directions appropriate for the student's abstraction level in order that the student will feel **competent** while he is working and rewarded upon completion.

c. Arrange for his progress to be monitored by a competent evaluator such as yourself, an aide, or an advanced (and mature) student.

d. Adjust task levels and working times to match student needs.

e. Personally discuss the student's progress regularly, regardless of whether it is satisfactory or unsatisfactory. (The time allowance for this sort of thing is a basic part of instructional design.) Go on to #4.

4. In addition to the criteria presented in #3 above:

   a. Select a partner or partners for the students who have behavior characteristics and levels of competence which are appropriate for the student at issue.

   b. If the instructor is to be an active part of the interaction environment, and if the instructor's role is **other** than that of authority, such as might be the case in an instructional game or simulation, be certain that the roles are clearly differentiated for the student.

5. a. Be certain that the purposes of the interaction are clearly understood (as evidenced by the resulting appropriate student behaviors).

   b. Select a partner or partners whose behavioral characteristics and levels of competence are appropriate for the student at issue.

   c. If the instructor is to be an active part of the interaction environment, and if the role of the instructor is **other** than that of authority (as in a game or simulation) be certain that the roles are clearly differentiated by the student.

Note: Beware of negative attitudes and prophesies if you are a part of a design team as these have a way of becoming self-fulfilling.

MATCHING THE IDEAL INSTRUCTIONAL SYSTEM WITH ECONOMIC CONSIDERATIONS*

ASSUMPTIONS

The entry behavior of the student has been defined in terms of instructional objectives.

The instructional objectives have been refined in view of the entry behavior identified for the student.

A selection of media, a sequence of interaction and an evaluation scheme has been designed when the environment is matched with student entry behavior in order to facilitate the adoption of appropriate student behavior without regard for time or cost.

A strategy for facilitating the student's interactions with the instructional system has been developed in consideration of the factors presented while facilitating student behavior in the instructional environment.

ECONOMIC CONSIDERATIONS (STEPS)

1. Add up the cost of the instructor's (or design team's) time in supervising the development of the instructional system.

2. Add up the cost of additional professional assistance and clerical help in designing and managing the instructional system.

3. Add up the costs of all materials and administrative overhead.

4. Add each of the above into a total cost, and find out what the budget will be.

5. Is the cost of the instructional system within the permissible budget?

   "Yes!" Great! You're in business! Go on to your next project!

   "No!" Don't give up, go to #6 below.

6. Find out the current average cost/student ratio for the type of instruction currently being given in that area.

7. Divide the cost of the new instructional system by the **total** number of students to use it over the several years that it can be used before revision.

*Note that this analysis of the setting requires the collection of a variety of data.

8. Does the cost per student now fall within acceptable limits?

   "Yes!" Great! You're in business and have demonstrated your ability to make use of **a capitol investment of time and money.**

   "No!" Don't give up yet! Go on to #9 below unless you have been there before in which case go on to #10 below

9. Can some of the materials which would be developed for the instructional system **also** be used for some **other** instructional system?

   "Yes!" Repeat steps #1 through #8 above with that consideration.

   "No!" Alas! Go to #10 below.

10. Where there is a will there is a way! However, suppose that in spite of your best efforts the team is unable to convince the right people of the potential of the instructional system at a level sufficient to bring in the needed dollars. This assumes, of course, that you have sought administrative advice throughout the planning stage, consulted with associates (and thereby obtained their support). involved students, and have taken pains to demonstrate your proposed system's relevance to what has been successful elsewhere. Now you must revise your initial assumption of unlimited funds. Go to #11 below.

11. Since you have carefully designed a system which you are maximally certain can do the job, because you have accounted for entry behaviors and behavioral objectives, you should now **compromise in such a way that the basic integrity of the system is preserved:**

    Step 1 – Eliminate those costly features which **least** effect the characteristics of the basic design.

    Step 2 – Retain those features you can, even though expensive, which will provide a solid foundation for further development as more money becomes available later.

    Step 3 – Repeat steps 1 and 2 until the cost of the system matches the budget.

COMMENTS

1. Suppose you designed a $25,000 instructional system for a budget that turned out to be only $10,000. It may appear that you have wasted your time and energy in not immediately designing a system to fit into the available $10,000, however, there are more important factors to consider:

2. If you simply designed a system for $10,000 it is highly unlikely that your developmental sequences would have been as thorough and that you would have defined the **ideal** instructional environment worthy of your objectives. Thus you would inadvertently capitulate at the $10,000 level without being aware of more desirable alternatives.

3. By proposing and **defending** a $25,000 system, it is more likely that the project could be funded at the $15,000or $20,000 level.

4. By first designing the ideal instructional system in view of the student's entry behavior and defensible instructional objectives, instead of hardware being purchased in advance **as is usually the case** (i.e., "Now that we have the television, we should form a committee to insure that it will be used wisely!"), the hardware will be purchased last, **as should be the case**!

5. You will have a solid theoretical foundation upon which to build as additional monies become available. Your direction and justification have been accounted for as you build upon the initial $10,000 investment.

6. The instructional development team is fully accountable for and can defend the instructional system at the $10,000 level and throughout its continuing development as funds become available.

APPENDIX 7 Flow Charting in Instructional Design and Technology

by Stephen L. Yelon

Used by permission of Stephen L. Yelon
Assistant Professor of Education and
Assistant Director of Learning Service
Michigan State University
East Lansing, Michigan

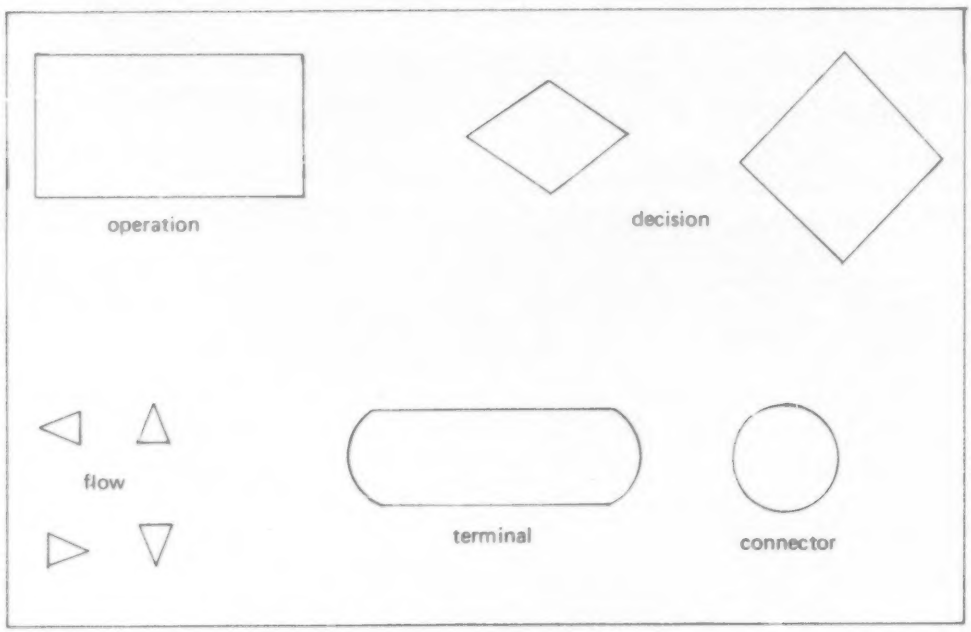
SUGGESTED PROCEDURE

(Although the following outline is divided into lessons, this does not imply that the material outlined is necessarily to be covered in one day. You may find that the students fail to understand a concept and therefore need more time in which to grasp the idea. Conversely, you might observe a ready assimilation of the material to the point that two lessons could be combined into one. You must be prepared for either case.)

LESSON 1:

I. Teacher-directed discussion
   A. Development of flow charting
   B. Advantages of flow charting
   C. Uses of flow charting

II. Demonstration of a simple flow chart (How to Sharpen a Pencil) on overhead projector
   A. Ask several students to actually try to follow flow chart
   B. Class discussion of flow chart
   C. Explanation of standard symbols used
      1. Use transparency of standard symbols
      2. Explain decision-making symbol (diamond) as asking a question which can only be answered **yes** or **no**



7-1

III. Class, with teacher help, decides on subject to flow chart.
   A. Suggestions: how to open a door or window in the classroom, average age of class members, average height or weight of class members.
   B. Each student tries, individually, to list the steps and then make his own flow chart.
   C. When all completed, student volunteer places his flow chart on the board or overhead projector.
      1. steps should be added by class members until chart is as detailed as seems feasible
      2. Student then revises flow chart
      3. several students try to follow chart
      4. revision, if necessary

IV. Individual topics
   A. Teacher distribures mimeograph copies of Standard Symbols, Suggested Topics for Flow Charting, an example of a flow chart (may be "How to Eat Peanuts"), and the flow chart "Learning How to Use Flow Charts".
   B. Each student choose a topic to flow chart. He may or may not choose from the list given. Teachers should approve topic if not chosen from list.

LESSON 2:

   C. When flow charts completed, each student chooses partner
      1. exchange flow charts and try to follow partner's chart
      2. give suggestions for changes or additions to chart, if indicated
      3. may have several charts placed on board for discussion
      4. may review standard symbols from charts on board

LESSON 3:

V. Flow charting algorithms (whole numbers)
   A. Individual problems
      1. give each student a different problem to work
      2. students write down steps performed in the problem in preparation for making a flow chart
      3. students flow chart own problem
      4. students compare answers and flow charts with a partner
      5. if student is unable to flow chart a problem, ask him to try a simpler problem
      6. if student is successful, he then prepares flow chart for addition, multiple digits
      7. if student is unsuccessful, ask him to follow the master flow chart with several examples
      8. students keep addition flow chart in their folders or notebooks

LESSON 4:

VI. Additional sessions, if needed, may be assigned to clarity flow chart procedures.

NOTES

As a word of **caution**: Don't **over**-use flow charting. It has been the experience of those teachers who have forced too much flow charting upon their students that the students soon become disenchanted with the procedure and cease to do it. Use the flow charting techniques as a tool to provide for a high ratio of success for all students and to serve as a vehicle to improve the logical reasoning of each student.

DO:

- encourage students to re-use subroutines once they have been flow charted.
- give students a choice of flow chart exercises by providing a list of possibilities from which to choose.
- provide a list of abbreviations for terms to be used in flow charts.
- keep a file of master flow charts for arithmetic operations.
- make sure the student understands the problem before he attempts to flow chart it.
- use the motivational factor of flow charting to introduce new mathematical terms.
- provide a place for storing student's flow charts.

DON'T:

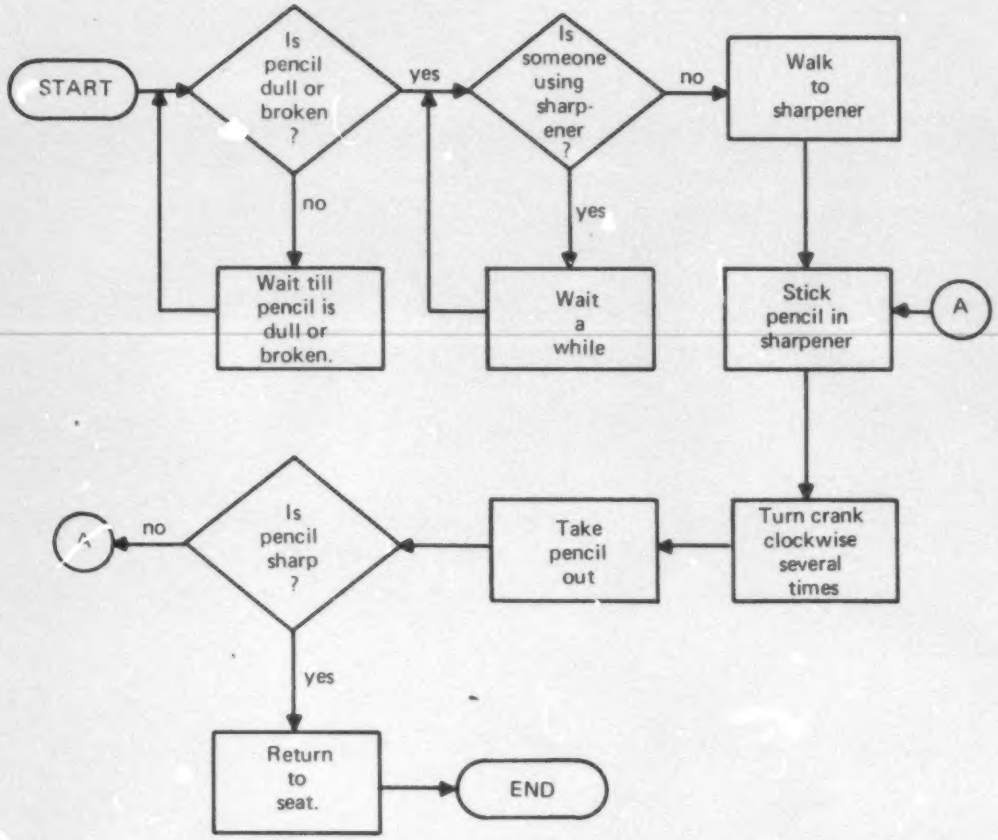
- ask a student to re-do the same chart over and over.
- let the flow chart problem become too complex.
- over-use the flow chart technique.
- be critical of students whose first efforts fail or are not as logical as you would like.

EVALUATION

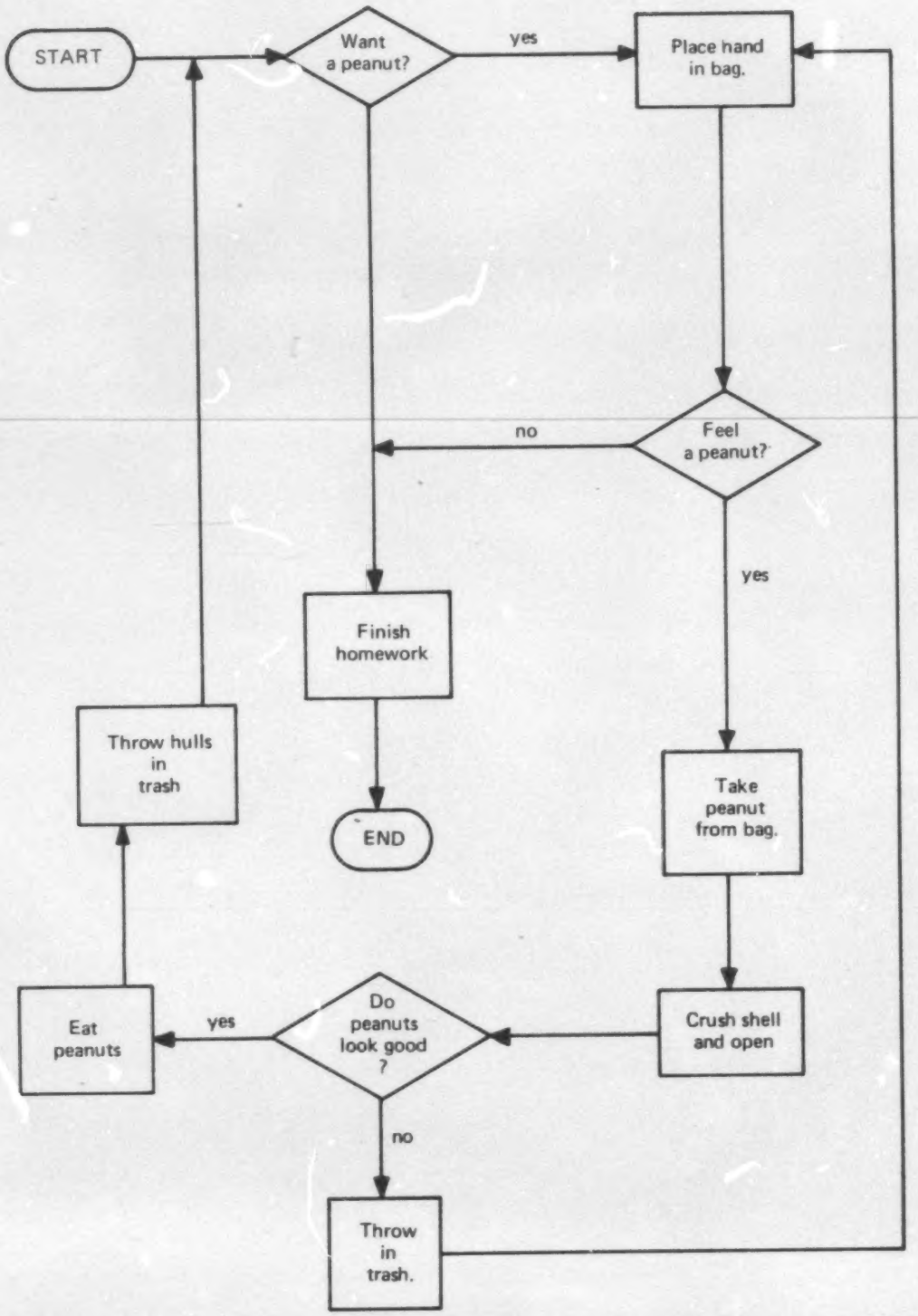
It is our opinion that posttesting is unnecessary in this unit. We would hope that this activity be used as a motivational opening for the year – something different and pleasant for the student.

Please remember that all comments by the authors of these units are merely suggestions. It is always your perrogative to use any means of evaluation you prefer.

HOW TO SHARPEN A PENCIL

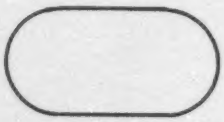
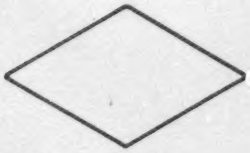


HOW TO EAT PEANUTS



7-5

STANDARD SYMBOLS

Symbol	Use
 Geometric name: OVAL	To start and end a program or procedure
Geometric name: RECTANGLE	An instruction or operation
 Geometric name: RHOMBUS Common name: DIAMOND	A decision or question that will be answered yes or no
Geometric name: CIRCLE	A connector in case the flow chart must be continued in another place
Arrows	Shows direction or flow of steps in flow chart

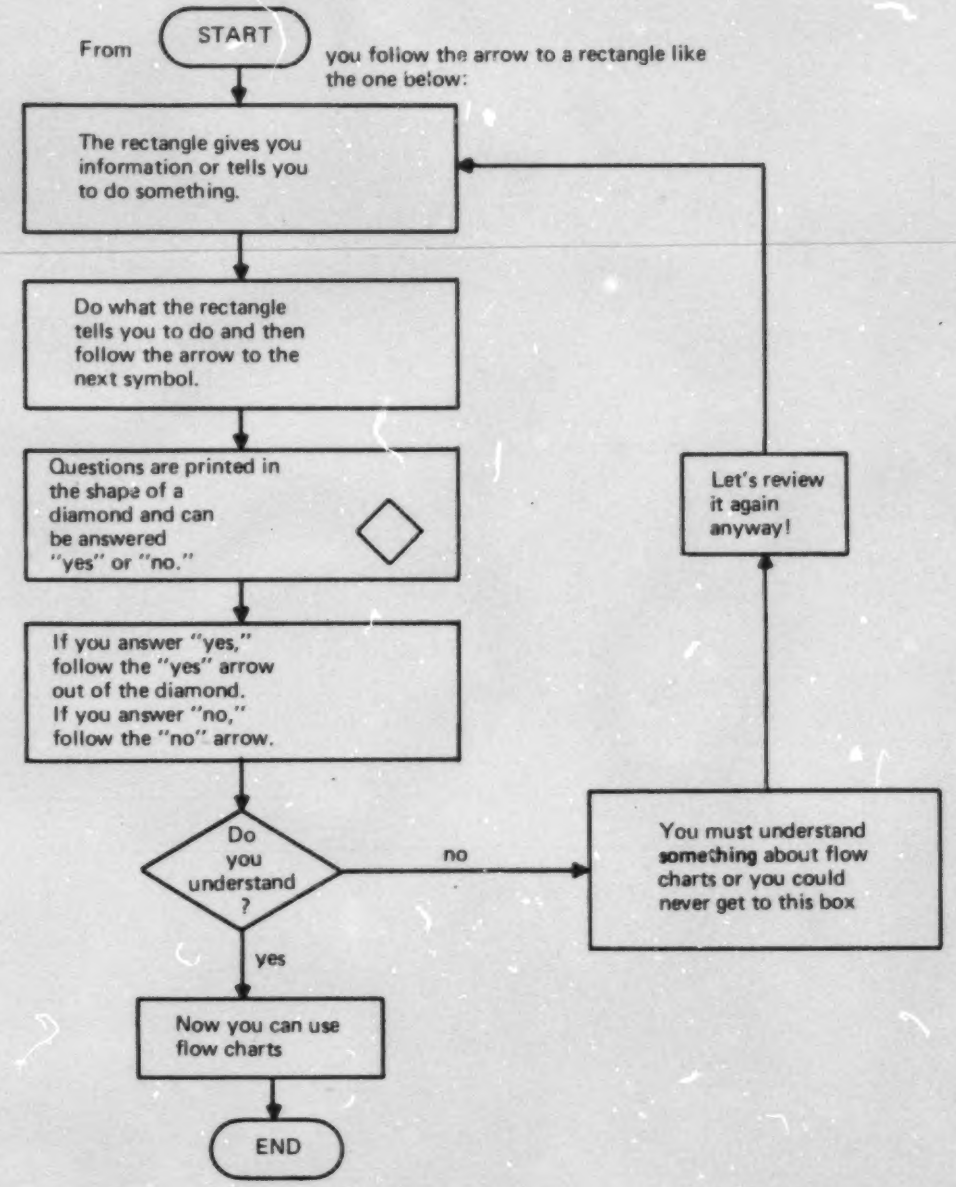
SUGGESTED TOPICS FOR FLOW CHARTS

How to open a door
How to get a book from your locker
How to mail a letter
How to take curlers out of your hair
How to set the table for a meal
How to start a car
How to make a sandwich
How to change a flat tire
How to fill a car with gas at a gas station
How to change a burned-out light bulb
How to polish your shoes
How to apply fingernail polish
How to shift gears with a "straight stick"
How to find a specific library book
How to steal second base
How to shorten a hem on a skirt
How to adjust a picture on a TV set
How to make lemonade
How to add, subtract, multiply, or divide two 2-digit numbers
How to saw a board to a specific length
How to take a photograph
How to thread a movie projector
How to eat corn on the cob
How to play a phonograph record
How to string a bow
How to lead a cheer

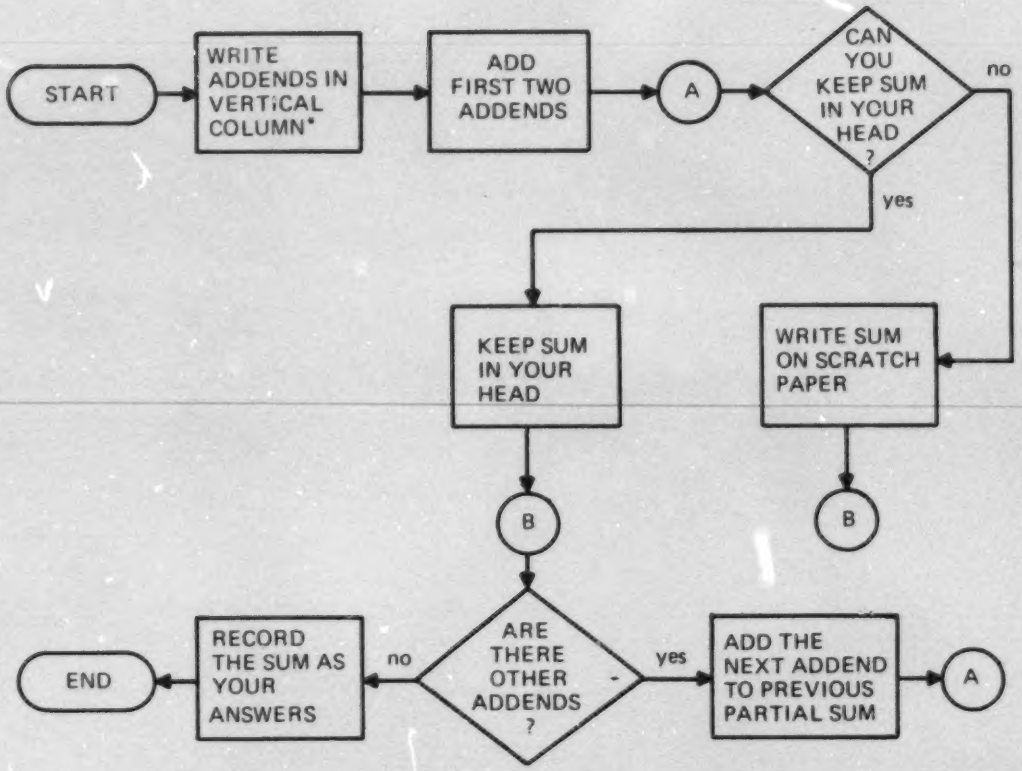
A FLOW CHART FOR LEARNING HOW TO USE FLOW CHARTS

Flow charts are used to program computers, explain complicated procedures in a fairly simple way, and are fun to use.

Flow charts start with an oval like this: START


From
START
you follow the arrow to a rectangle like the one below:
The rectangle gives you information or tells you to do something.
Do what the rectangle tells you to do and then follow the arrow to the next symbol.
Questions are printed in the shape of a diamond and can be answered "yes" or "no."
If you answer "yes," follow the "yes" arrow out of the diamond. If you answer "no," follow the "no" arrow.
Do you understand ?
no
You must understand something about flow charts or you could never get to this box
Let's review it again anyway!
yes
Now you can use flow charts
END

ADDITION – Single Digit Addends



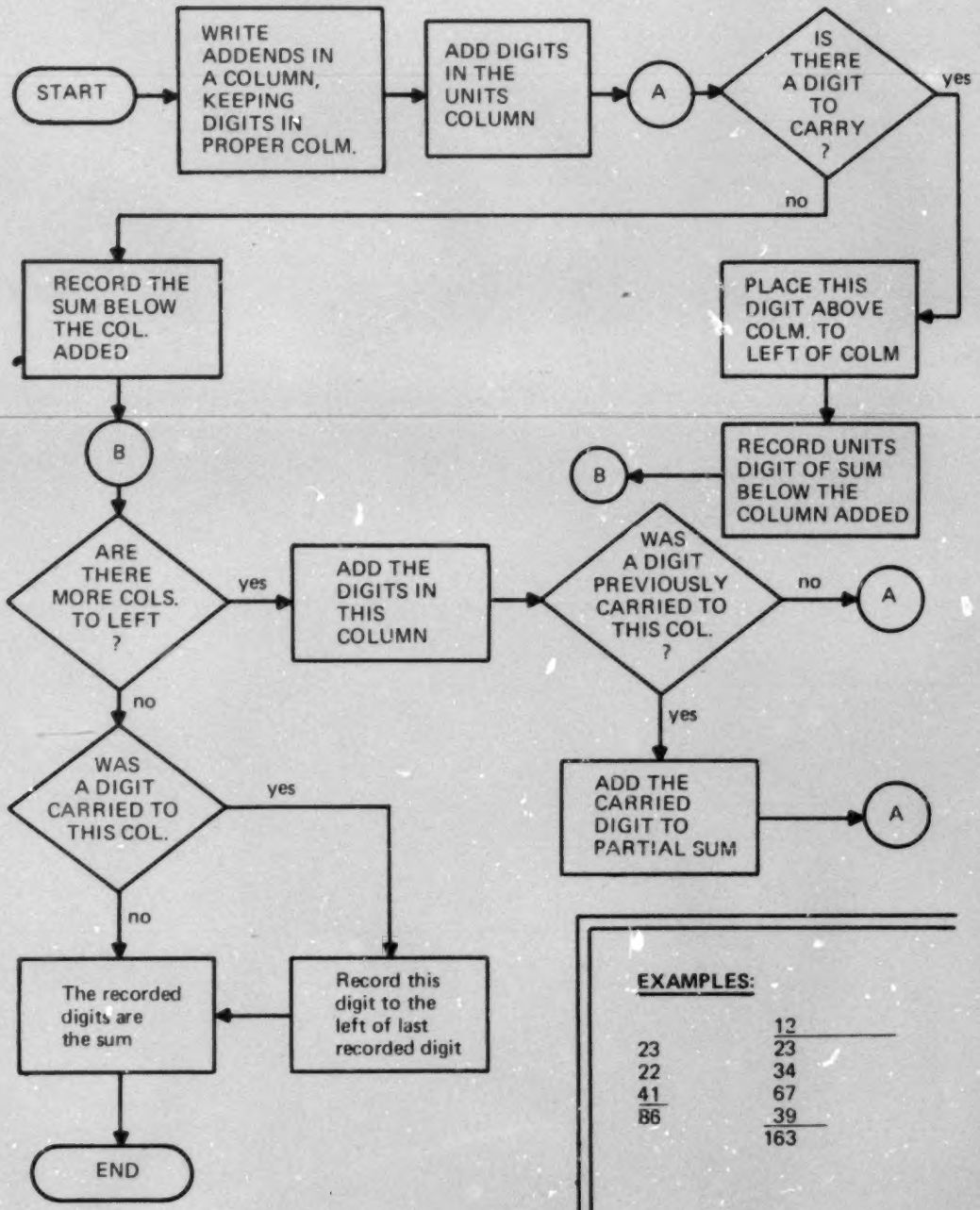
$$\begin{array}{r} 7 \\ 6 \\ \hline 13 \end{array} \qquad \begin{array}{r} 7 \\ 6 \\ 5 \\ \hline 18 \end{array} \qquad \begin{array}{r} 7 \\ 6 \\ 5 \\ 3 \\ 4 \\ \hline 25 \end{array}$$

***ASSUMPTIONS**

1. Student knows what addend, vertical column, and partial sum are.
2. Only positive integers (whole numbers) are to be added.

7-8b

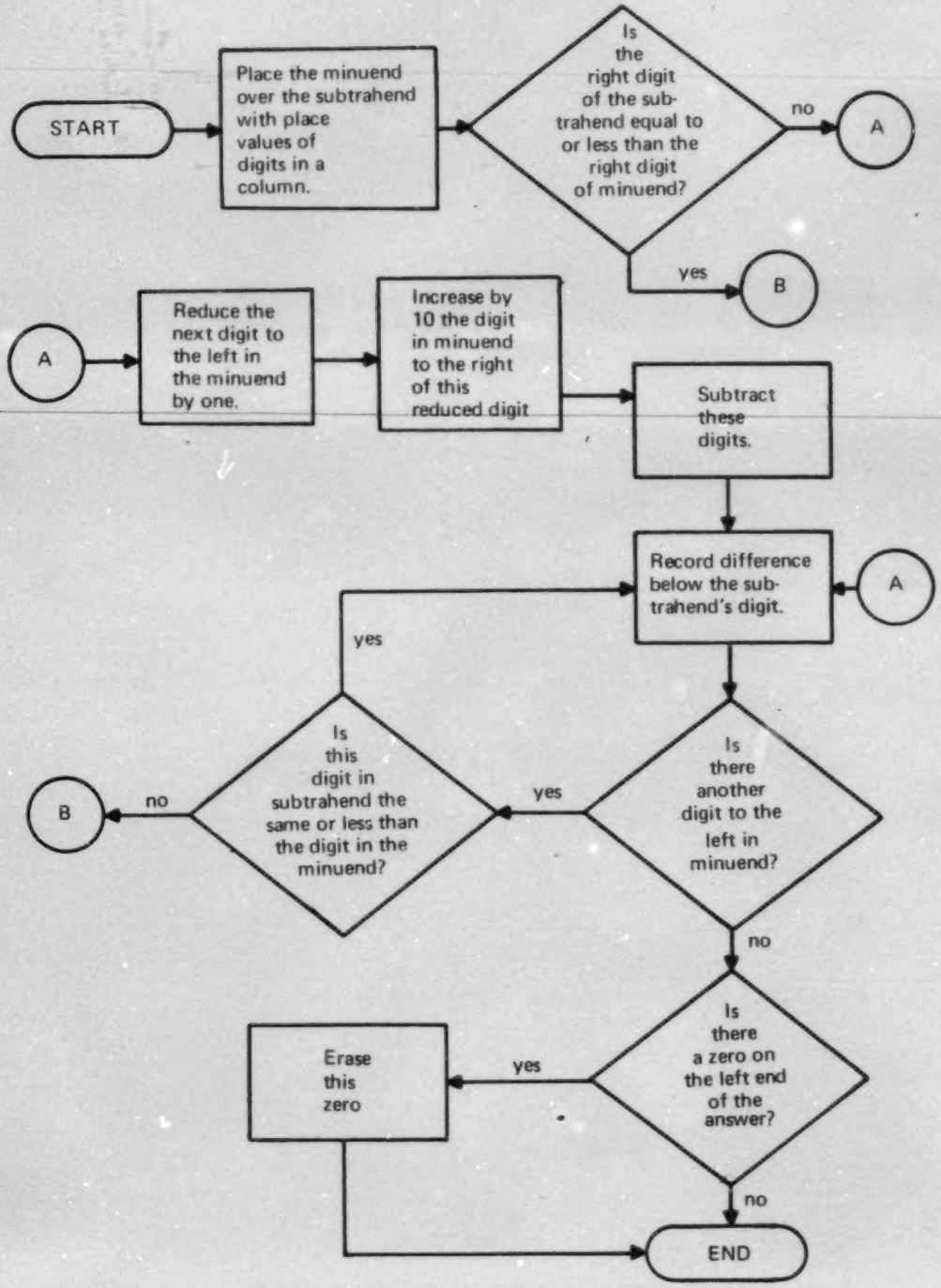
ADDITION: Multiple-Digit Addends


START
WRITE ADDENDS IN A COLUMN, KEEPING DIGITS IN PROPER COLM.
ADD DIGITS IN THE UNITS COLUMN
A
IS THERE A DIGIT TO CARRY ?
yes
no
RECORD THE SUM BELOW THE COL. ADDED
PLACE THIS DIGIT ABOVE COLM. TO LEFT OF COLM
B
RECORD UNITS DIGIT OF SUM BELOW THE COLUMN ADDED
B
ARE THERE MORE COLS. TO LEFT ?
yes
ADD THE DIGITS IN THIS COLUMN
WAS A DIGIT PREVIOUSLY CARRIED TO THIS COL. ?
no
A
no
yes
WAS A DIGIT CARRIED TO THIS COL.
yes
ADD THE CARRIED DIGIT TO PARTIAL SUM
A
no
The recorded digits are the sum
Record this digit to the left of last recorded digit
END

EXAMPLES:

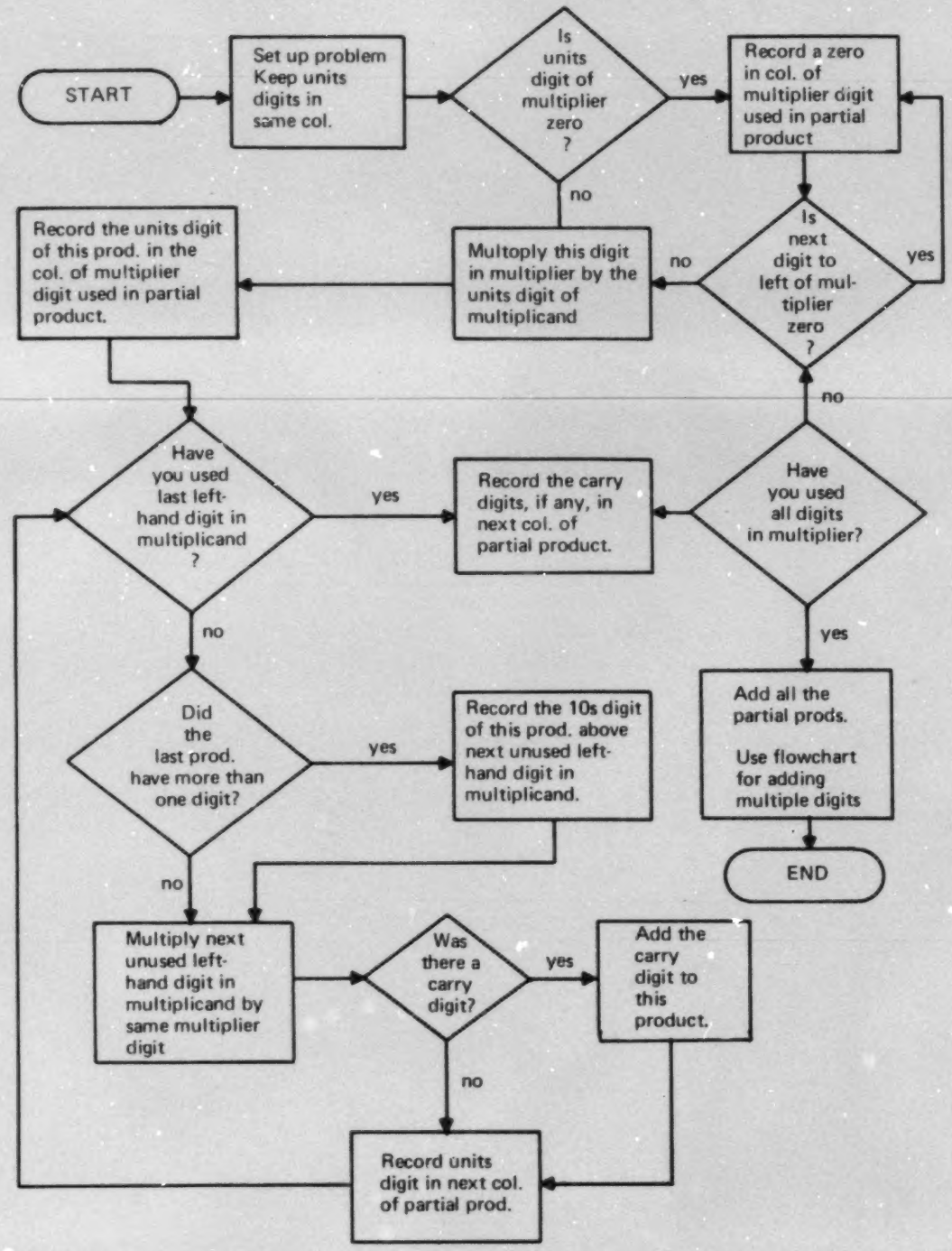
	12
23	23
22	34
41	67
86	39
	163

SUBTRACTION: Multiple Digits


START
Place the minuend over the subtrahend with place values of digits in a column.
Is the right digit of the subtrahend equal to or less than the right digit of minuend?
no
A
yes
B
A
Reduce the next digit to the left in the minuend by one.
Increase by 10 the digit in minuend to the right of this reduced digit
Subtract these digits.
Record difference below the subtrahend's digit.
A
yes
Is this digit in subtrahend the same or less than the digit in the minuend?
no
B
yes
Is there another digit to the left in minuend?
no
Is there a zero on the left end of the answer?
yes
Erase this zero
no
END

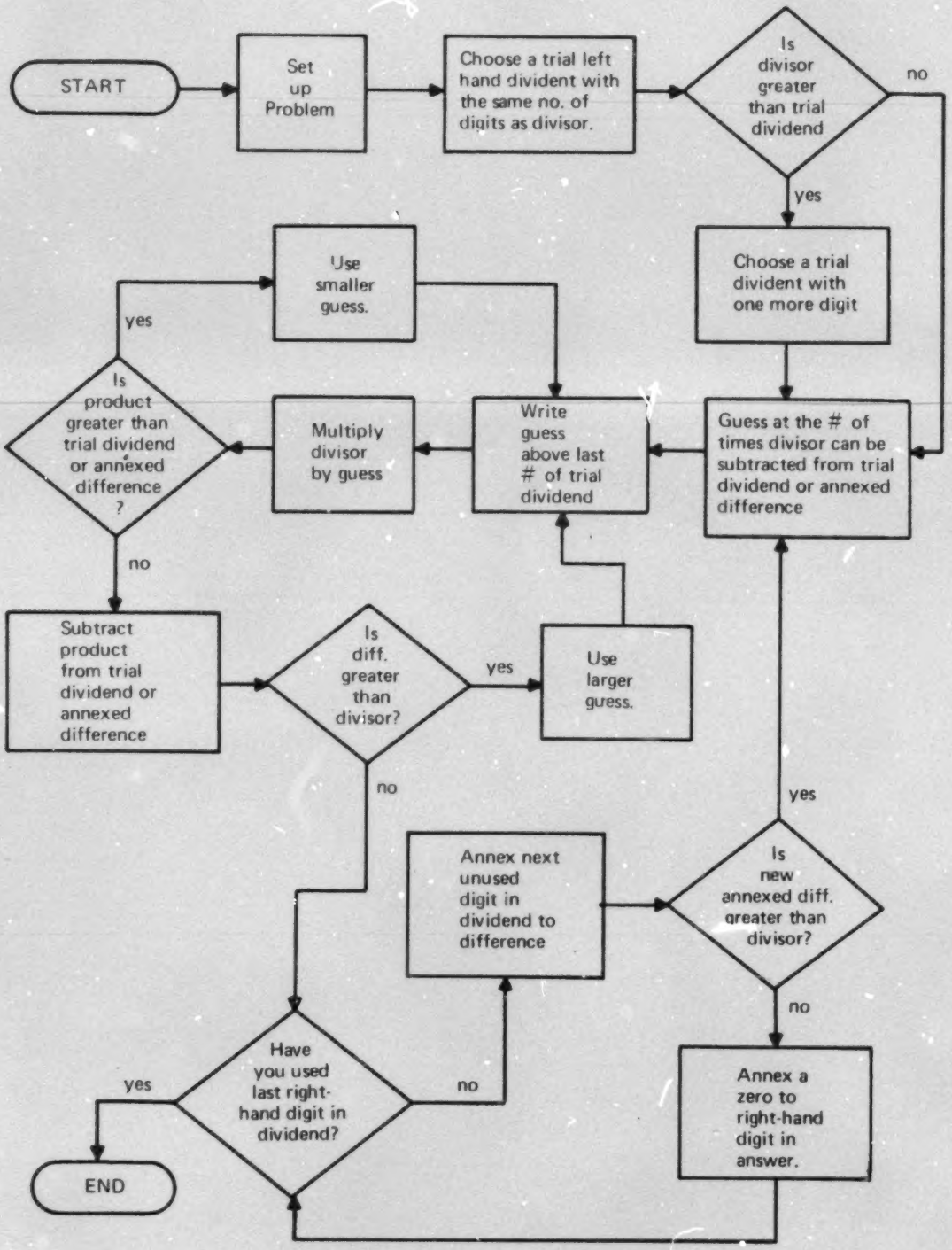
7-10

MULTIPLICATION: MULTIPLE DIGITS


START
Set up problem Keep units digits in same col.
Is units digit of multiplier zero ?
yes
Record a zero in col. of multiplier digit used in partial product
no
Is next digit to left of multiplier zero ?
yes
no
Multoply this digit in multiplier by the units digit of multiplicand
no
Record the units digit of this prod. in the col. of multiplier digit used in partial product.
Have you used last left-hand digit in multiplicand ?
yes
Record the carry digits, if any, in next col. of partial product.
Have you used all digits in multiplier?
no
yes
Did the last prod. have more than one digit?
yes
Record the 10s digit of this prod. above next unused left-hand digit in multiplicand.
Add all the partial prods.
Use flowchart for adding multiple digits
END
no
Multiply next unused left-hand digit in multiplicand by same multiplier digit
Was there a carry digit?
yes
Add the carry digit to this product.
no
Record units digit in next col. of partial prod.

7-11

DIVISION: Multiple Digits


START
Set up Problem
Choose a trial left hand divident with the same no. of digits as divisor.
Is divisor greater than trial dividend
no
yes
Choose a trial divident with one more digit
Guess at the # of times divisor can be subtracted from trial dividend or annexed difference
Write guess above last # of trial dividend
Multiply divisor by guess
Is product greater than trial dividend or annexed difference ?
yes
Use smaller guess.
no
Subtract product from trial dividend or annexed difference
Is diff. greater than divisor?
yes
Use larger guess.
no
Is new annexed diff. greater than divisor?
yes
Annex next unused digit in dividend to difference
no
Annex a zero to right-hand digit in answer.
Have you used last right-hand digit in dividend?
yes
no
END

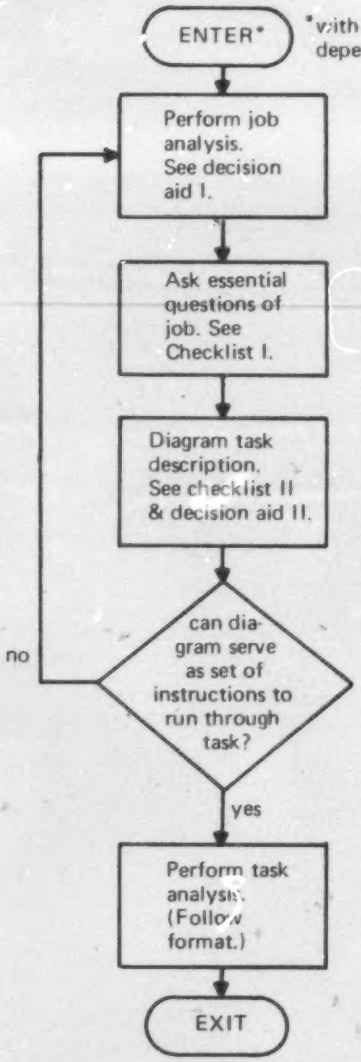
APPENDIX 8

Task Analysis in Instructional Design and Technology

by Stephen L. Yelon

Used by permission of Stephen L. Yelon
Assistant Professor of Education and
Assistant Director of Learning Service
Michigan State University
East Lansing, Michigan

Analyzing Operationalized Dependent Variables


ENTER*
*with operationalized dependent variables
Perform job analysis. See decision aid I.
Ask essential questions of job. See Checklist I.
Diagram task description. See checklist II & decision aid II.
can diagram serve as set of instructions to run through task?
no
yes
Perform task analysis. (Follow format.)
EXIT

Decision Aid I.	
Resource Available	Procedure
Ordered by priority 1. Expert working on job. 2. Expert working in simulation. 3. Expert not working 4. Manual or test	a. Several observers observe several experts, b. ask to think aloud. Interview or give survey Read.

Checklist I.
For each step and/or decision record 1. What learner looks at. 2. What learner looks for. 3. What learner does. 4. Where learner checks. 5. What learner checks for. 6. What learner does to remedy possible errors. When all answered yes, Proceed.

Decision Aid II.	
Present flow diagram	Procedure
string of decisions – followed by revisions	Convert to checklist.
Many decisions in a row – with few operations that follow or many decisions in complex combinations for few operations.	Convert to decision aid.

Checklist II.
Does the flow diagram: 1. Contain all relevant information collected in job analysis? 2. Describe the type of task (not a specific example of the task)? 3. Stand so complete that a learner could follow as a set of directions? 4. Follow diagramming rules: a. enter or start with conditions in objective? b. use criteria in its decisions? c. contain no dead ends? d. contain only binary decisions? e. contain one lead from each step? f. include what learner looks for, looks at, does, where he checks, what he checks for; and remedies?

What You Need is Analysis (Who Me?)

I. Need for Task Description and Analysis

Yes, you! Once upon a time an instructional researcher and developer, Mr. Cal Calculator wrote the following for an instructional project for Job Corps training.

Objective: The learner will compute and record in writing the prorated expenses for a given cash amount on the Monroe IQ calculator. The prorated expenses will be exact to the penny. Figures for proration will be provided.

Entry Behavior: Add and subtract using Monroe IQ calculator. Can perform all basic math processes in writing without use of calculator.

Evaluation (test): Prorate $1273.69, rental expense, according to the floor space occupied by each office.

Office	Floor Space
Administration	4850
Accounting	1945
Sales	2765
Advertising	1790
Records	2955

Our hero, Cal, also wrote this instructional plan to set up conditions for attaining the objective above:

Instructional Outline: Review basic math via programmed text. Pretest on Monroe Calculator skills. Practice review additions and subtraction briefly. Explain orally history of proration. Show algebraic proofs involving proration. Review written form of multiplication and division.
Practice multiply and divide on calculator. Explain how to recall memory. Define "memory." Explain to enter memory. Depress enter memory button, then set number.
Show how to multiply– recall memory, then divide. Allow practice of this section. Provide feedback. Post test.

You (our anti-hero) might ask:

Q: Is this the best instructional program to use to reach the objective on proration?

Q: Is it the most efficient means to accomplish this?

Q: Before you spend a great deal of time trying this out, what criteria could you use to judge the appropriateness of this program?

Q: Even on an empirical tryout – if a student failed to perform on the post test – how would you know which part of the instruction to change?

You point out to Cal that the plan above has many pitfalls; such as:

a. unnecessary irrelevant content.
b. inappropriate sequencing.
c. content omissions.
d. erroneous content.

Q: What method is used to recognize that these problems exist? How can Cal avoid these problems? Instead of jumping from objectives to instructional plans, what must be done?

A: A careful description and analysis of the behavior called for in the objective will yield a precise description of how the task is done and an analysis of that description will provide the required concepts, facts, principles, skills, and strategies.

II. HOW TO DO A TASK DESCRIPTION AND ANALYSIS

Q: What is a task description best used for?

A:
a. It is best used for tasks which employ more than one or two steps or decisions, i.e., these may be fixed or variable procedures.
b. It is least useful for simple cognitive exercises such as recall and comprehension of verbal material.
c. It is best when the instructor or developer has no knowledge of the area to be taught or knows it so well he cannot get it communicated to the learner.
d. It is best used when the objective, as it is stated, cannot be used to diagnose and remediate a given performance, when all the relevant content is not apparent from the objective, and when the sequence of learning is not self evident.
e. Even where demonstration is the mode used for teaching, verbal feedback giving specific cues and practice will be aided by a precise task description.
f. Now you respond. List some tasks related to your subject that could use task description.

Q: On what level do you do a task description?

A: a. At job level – of the "real world" job – mechanic.
At duty level – one part of the whole job – repair.
At task level – one part of a particular duty, e.g., how a c mechanic performs, how a tune-up is performed, how the timing of an engine is set.

b. You respond. Here are various levels of a task I am working on:

Q: How do you gain information about a task?

A: a. Watch actual performer.
Watch simulation. ("I heard is good, I saw is better.")
Interview expert.
Read manuals.
b. You respond. I would find task information for my tasks by:

Q: What do you look for?

A: What the performer
a. looks at – cues.
b. does – action.
c. uses to check his work – signals for feedback.

Q: How precise should a task description be?

A: Precise enough that a completely untrained person (who can point out the locations and identity of various object involved in the task) can perform the task, although not with the speed and accuracy of a trained person.

Example of task information

How to make a horseshoe electromagnet.

Observation notes: take a bolt about 5mm. in diameter and 30cm. long. Bend into u shape. Wire 3 or more layers off bellwire on arms leaving loop free. Leave about 30cm. wire free on each end after winding tape wire so it does not unwind. Remove insulation from coil ends. Attach two dry cells. Test polarity. One should be N, one S. If each same reverse direction of wire wound about second coil.

We could use these questions to **organize** the facts gathered:

a. what he looks at.
b. what he looks for.
c. what he does.
d. what looks at to check initial act.*
e. what he checks for.
f. what he does to remedy (or, if OK, recycle to step one).

*Do not forget **Murphy's Law: If something can go wrong; it will!** Program into the task description avoidance procedures or remedial procedures for critical operations.

Example of **organized** task information:

a. find bolt.
b. look for one 5mm. in diameter and 30cm. long.
c. bend into u shape.
d. check shape.
e. be sure like capital u.
f. straighten into u.

(Note: only a few of the steps and decisions have been shown here.)

Q: Why flow diagram the task information?

A: (This is not the only way to describe and analyze a task; but it has certain advantages.)

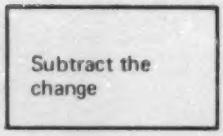
a. It provides an efficient symbolic shorthand.
b. It includes all steps and decisions and feedback loops.
c. You can see which are decisions, which are operations and how the progress of the task runs.
d. By looking at a flow diagram, you can determine whether a simple aid can be used in instruction such as a checklist.
e. You can view the structure of the whole task at once and perceive its relative complexity.

Q: What other ways can be used for task description?

A: a. Narrative form. – best used for heuristic methods and continuous tasks.
b. List of steps. – strictly linear algorithmic tasks and discrete tasks.

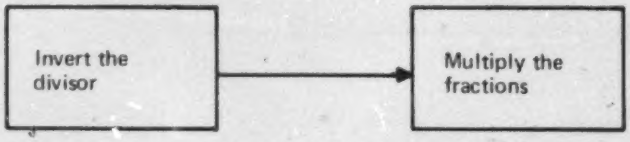
Q: What are the symbols used in a flow diagram?

A: A rectangle indicates a response on a flow chart.

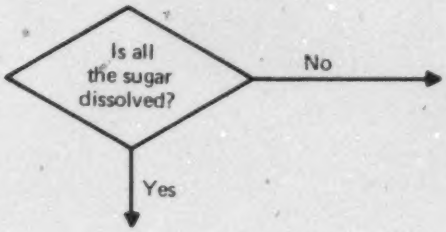


(each one of these responses may have a flow chart of its own.)

An arrow indicates the direction of the next step. What does he do after inverting the divisor?

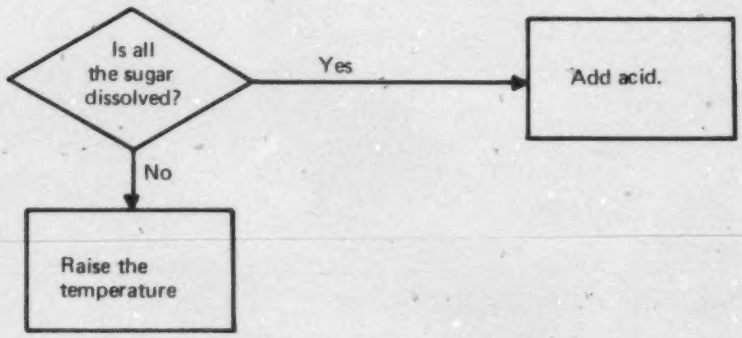


A diamond represents a question (binary decision).



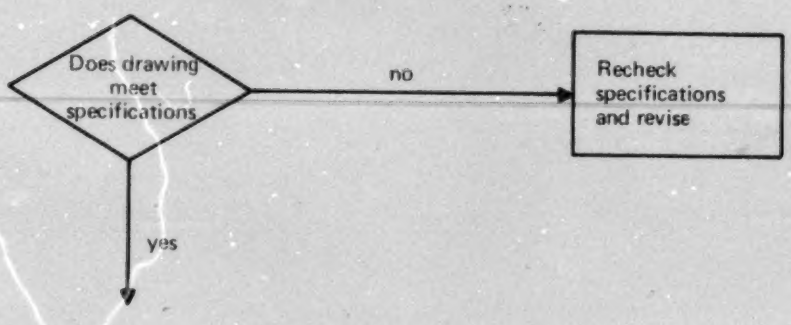
The questions are phrased so that there is a yes or no answer.

The arrows leading from a diamond show the alternatives to the decision. What happens if the sugar is dissolved? What if it isn't?

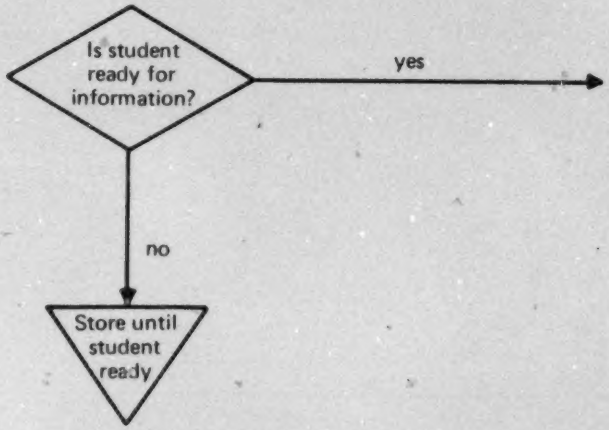


A feedback loop may look like this:

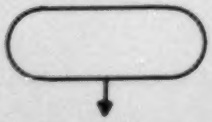
a. If the drawing does not meet specifications what does he do?
b. After revising what does he do?



A triangle indicates storage. This means file or store away the object or idea until it is called for. Call for things stored or remembered by an operation "recall from storage."



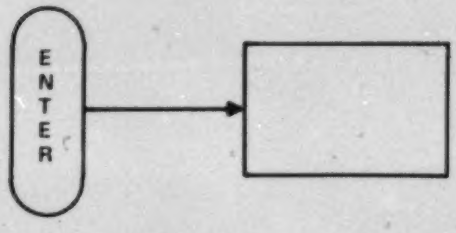
This sign is used for a terminal – entrance or exit. You indicate what materials the subject has when he enters, e.g., ENTER or START with two quart beakers and lab book.



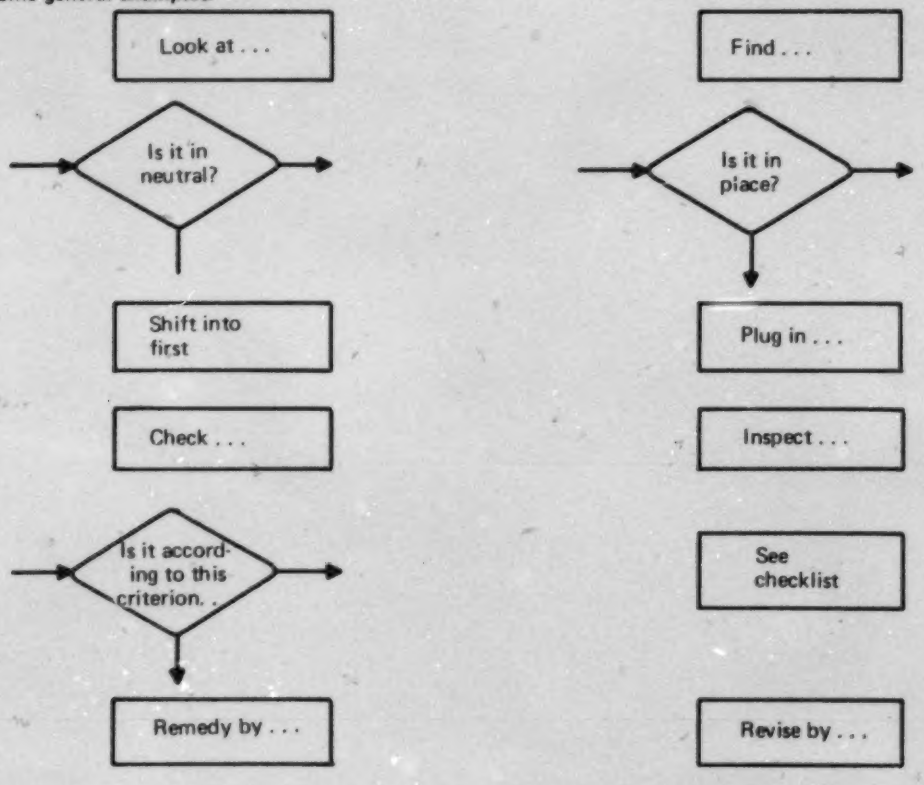
A common error: Which of these is more like the words in the ENTER step? What is the other statement?

a. with paper and pencil.
b. can add, subtract and multiply.

What is wrong with this step for an **objective on long division** where students entry behavior is – able to compute addition, subtraction, and multiplication problems?

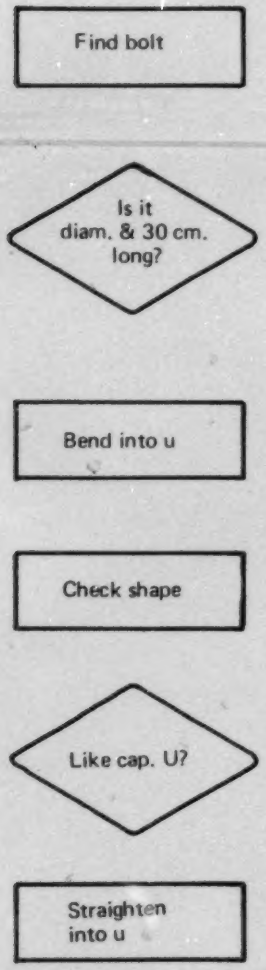


Some general examples:


Look at . . .
Is it in neutral?
Shift into first
Check . . .
Is it according to this criterion. .
Remedy by . . .
Find . . .
Is it in place?
Plug in . . .
Inspect . . .
See checklist
Revise by . . .

8-9

Example of electromagnet (continued) these are the organized facts converted to flow diagram symbols:

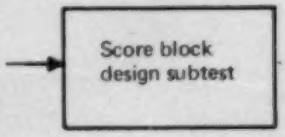
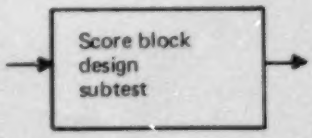
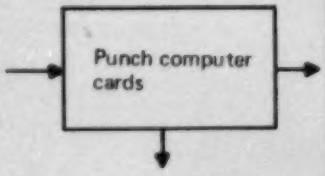
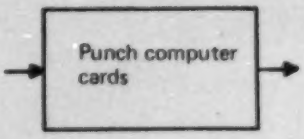
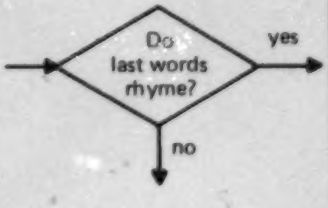
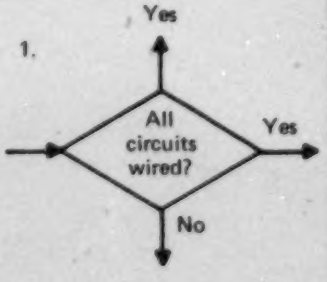
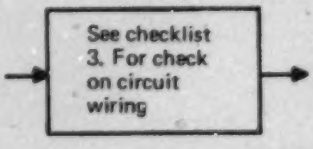


Q: What are the rules on constructing flow diagrams?

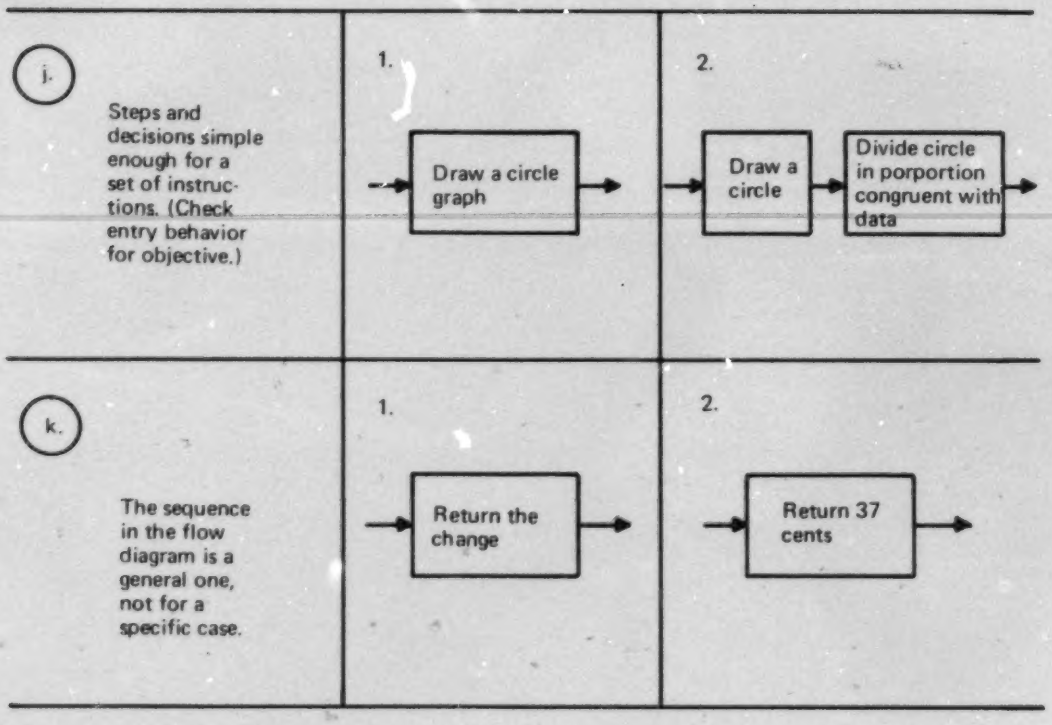
A: Which diagram supports the rule? (Answers follow)

a. Enter with material in objective's conditions	1. ENTER — Enter with knowledge taught	2. ENTER — Enter with compass and list of points
b. The analysis describes the performance at the time of the terminal or final exam	1. Study text material	2. Recall text material
c. Symbols are rectangle = operation and the diamond = decision (binary)	1. Salt dissolved? No → Raise temp. Yes ↓	2. Decide to raise temperature
d. Objective's criteria used in decisions	1. Are sentences correct? Yes → no ↓	2. Are sentences in accord with definition? yes → (see complete checklist) no ↓
e. Flow diagram includes only decision and performance of the learner	1. Hand in derived formulas	2. Teacher checks paper

A: Which diagram supports the rule? (continued)

f.	Steps are followed by other steps or decisions. the only exception is the last step.	1. 	2. 
g.	There is only one lead from each step	1. 	2. 
h.	Each decision is binary	1. 	2.
i.	Multiple decisions require decisions charts or checklist	1. 	2. 

A: Which diagram supports the rule? (continued)


j.
Steps and decisions simple enough for a set of instructions. (Check entry behavior for objective.)
1.
Draw a circle graph
2.
Draw a circle
Divide circle in porportion congruent with data
k.
The sequence in the flow diagram is a general one, not for a specific case.
1.
Return the change
2.
Return 37 cents

Answers

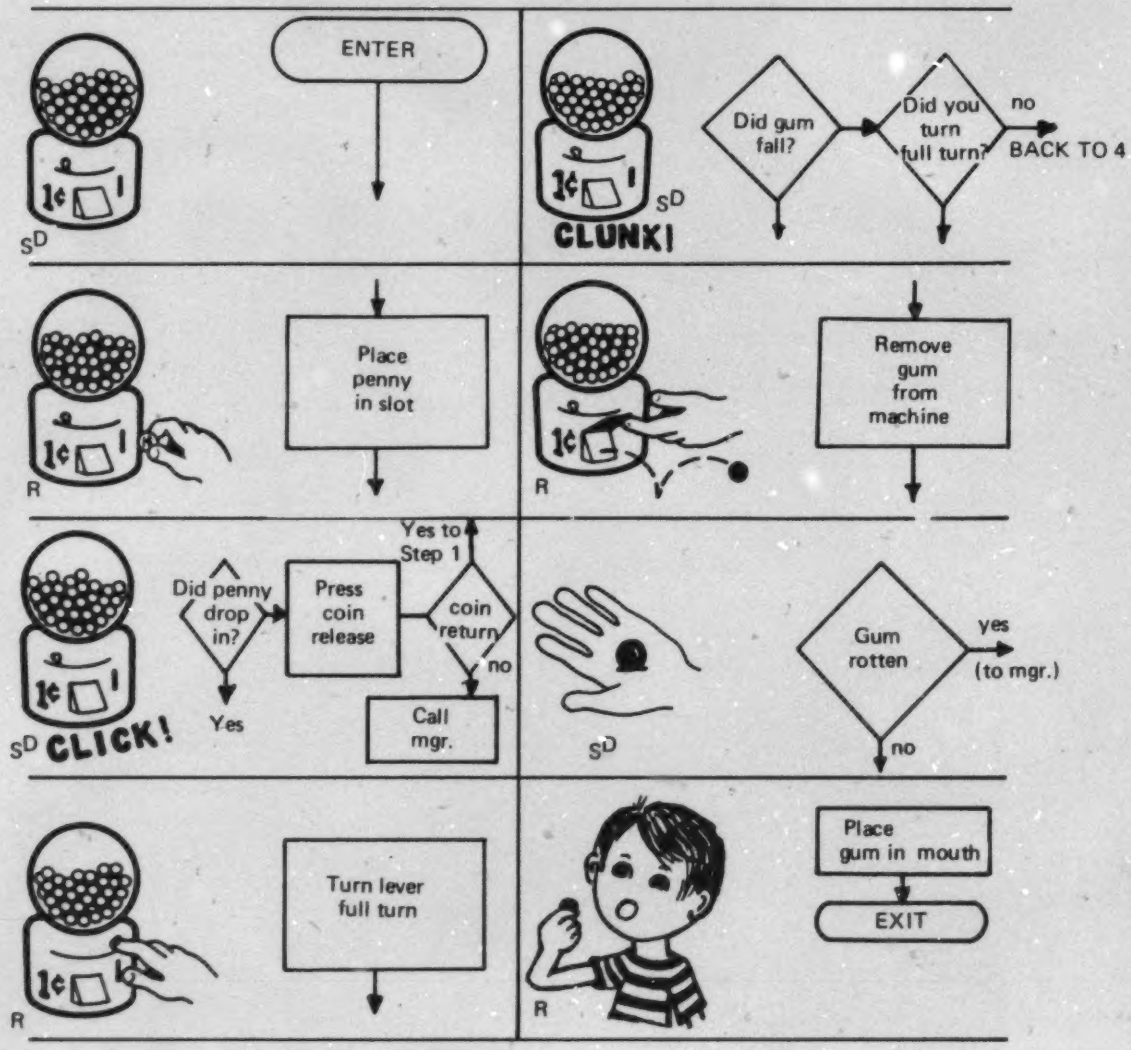
a. 2	g. 2
b. 2	h. 1
c. 1	i. 2
d. 2	j. 2
e. 1	k. 1
f. 2	

Answers

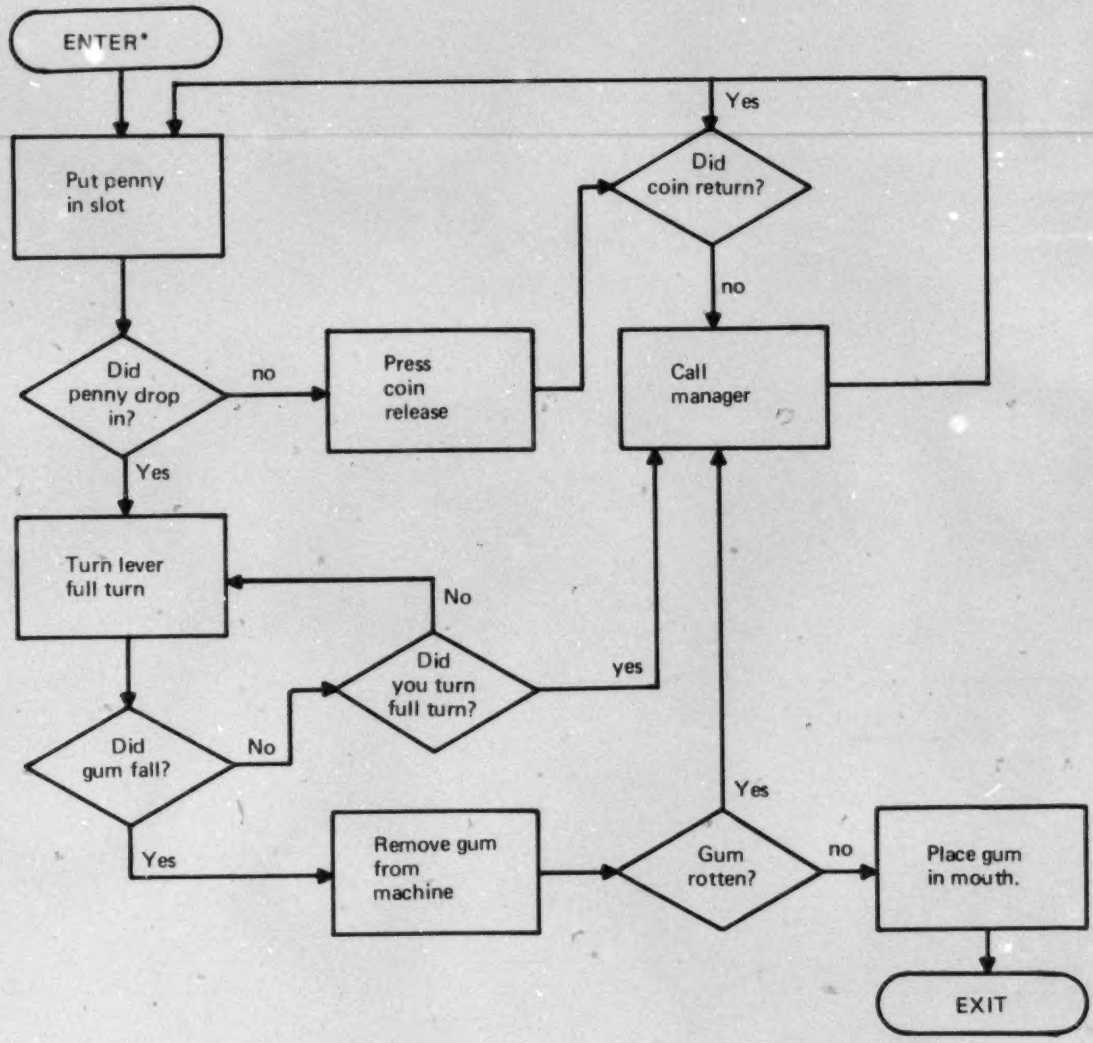
Q: How do you put the flow diagram together?
A: Take organized facts, symbolize with diagram, place in proper sequence:

Facts organized: Start with penny ► Gum balls in machine ► Puts penny in slot ► Hears penny drop in ► Turns lever ► Hears gum ball fall into receptacle ► Removes gum from the machine ► Sees and touches gum ball in hand ► Places gum in mouth

On a blank page put the chart together.

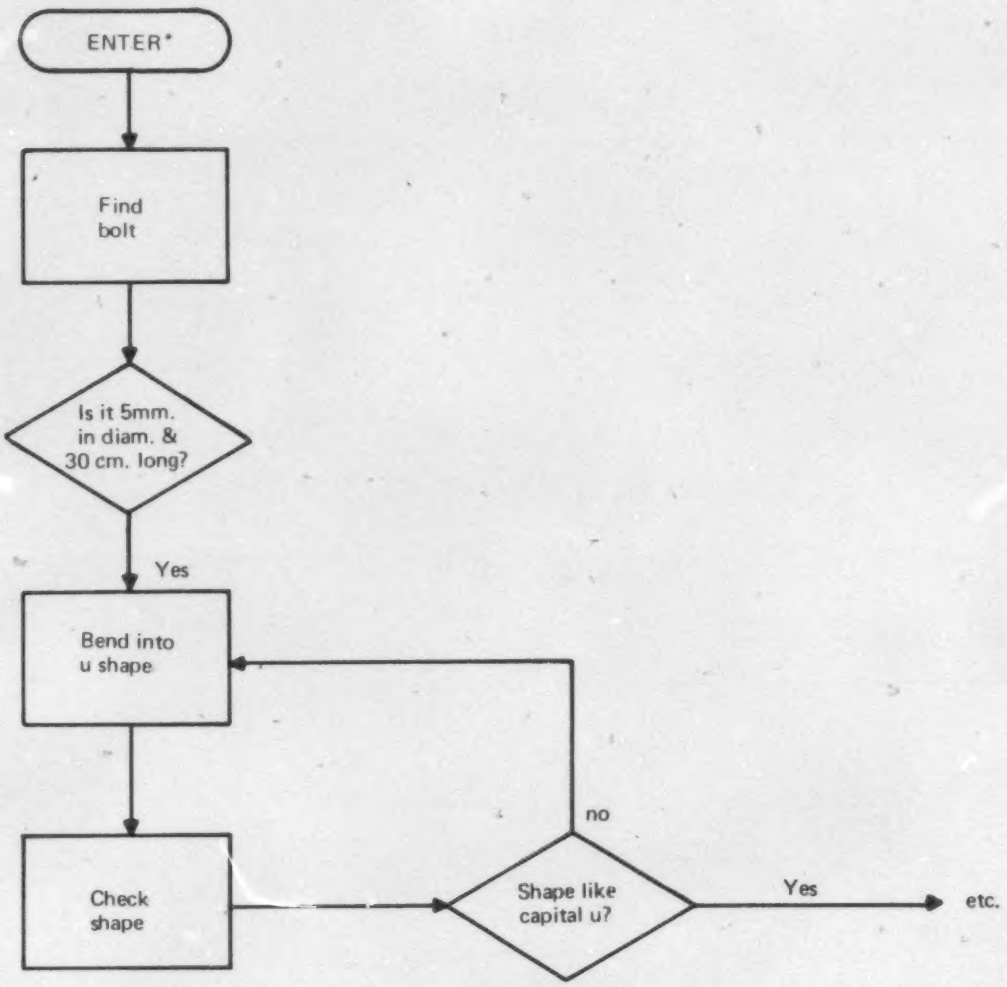


Here is how they might go:



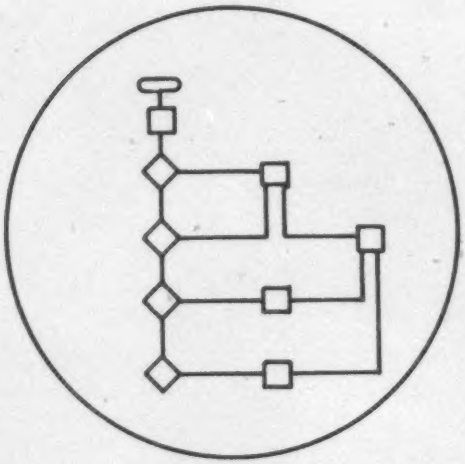
*With penny and gum machine

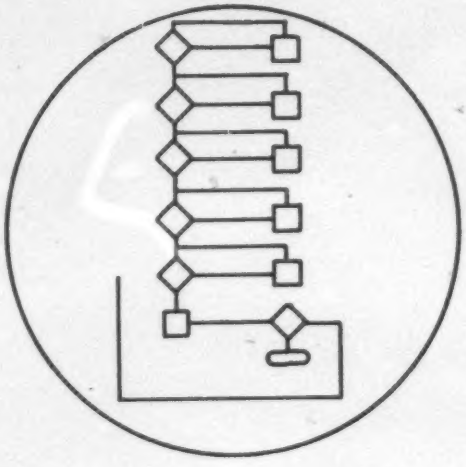
Example of electromagnet (continued): Here is how it begins to go together.



Q: Can any of these complex diagrams help in simplitying the organization of the task?

A: Yes





When a higher proportion of decisions to operations calls for a decision aid substitute step: "see decision chart" and create a decision aid like this:

Decision Chart

Priority	Availability	Activity
1	Direct obs.	Observe
2	Simulation	Observe
3	Expert	Interview
4	Manuals	Read

When a number of "decision-revision" steps in succession calls for a checklist substitute step "see checklist" and make a list like this:

Checklist

Every signal noted?
Every response noted?
Probable errors accounted?
All decisions noted?
Feedback sources noted?

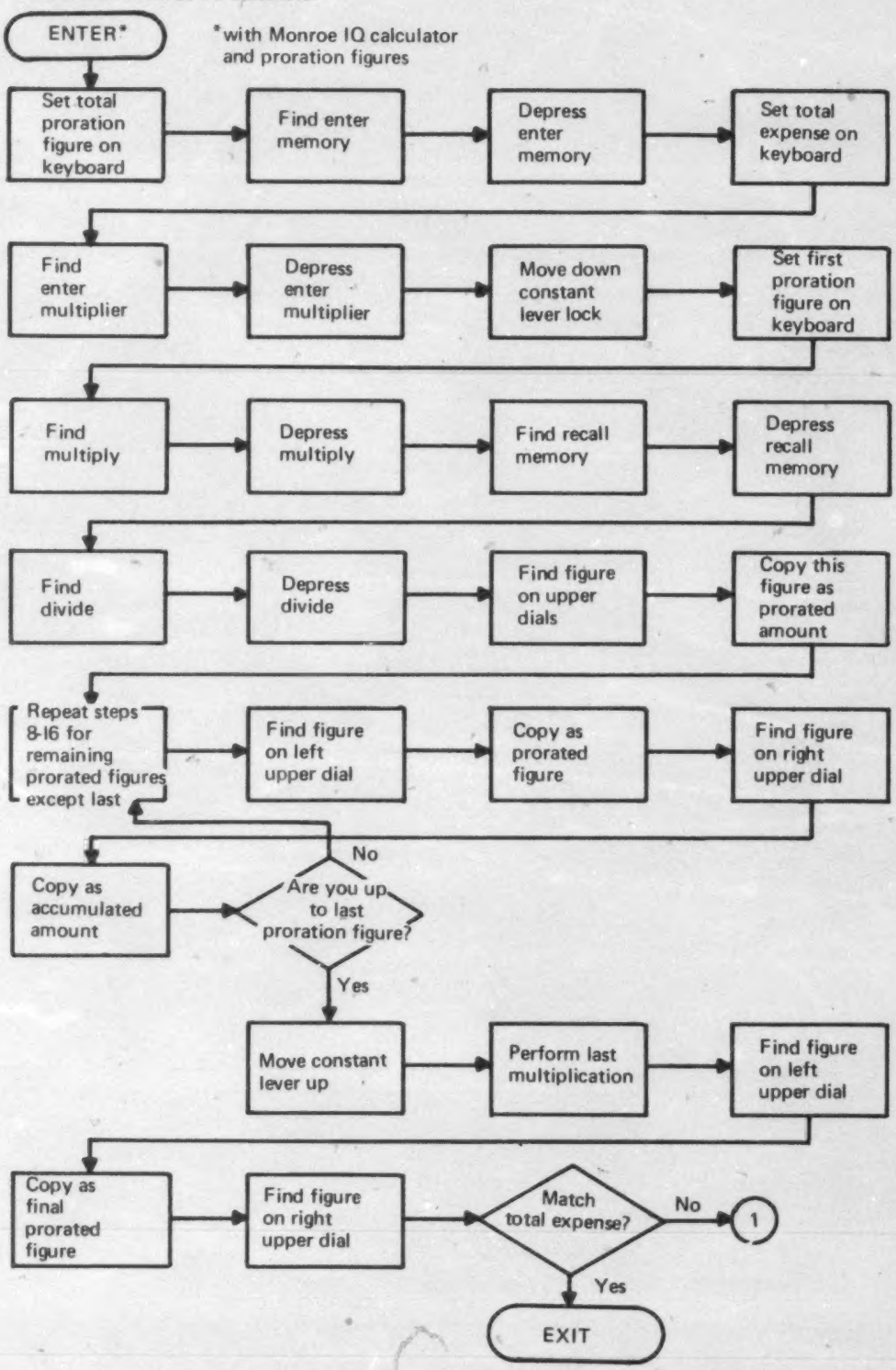
When all checked, proceed on.

Q: How do you know your task description is good enough?

A: Have a naive student go through the task using the flow diagram as a set of instructions. If the student can proceed through the task in line with the criteria, though not as quickly or accurately as a trained person, you can use this description as a basis for decisions for instruction.

The following is a "gem" done by Cal. I yelled at him because he did not have many decisions. Cal retorted by simply showing me a naive learner going through the entire task using the flow diagram as a set of instructions. Cal got the message!

Proration on Monroe IQ Calculator



This is an example of how to collect task information from an oral description of a task and how to flow diagram the task information.

A teacher of office management was annoyed by an instructional problem which she described as "lousy attitudes, sloppy workmanship, incomplete jobs, lack of critical thinking, lack of problem solving." When pressed to answer the question: "What do you want the students to do that they cannot do now? " she listed a number of things, including: being able to order the best quality supplies and equipment for their office' needs, for the least cost.

As we went over the stated requirements mentioned above I asked: Will you be able to choose course content from this statement? Will you be able to sequence your instruction? If the student was doing this task before your eyes, would the statement help you diagnose errors in her performance? She said "no" to these questions for most of the tasks. I suggested that we flow diagram the task. She was to tell me how to do it as if I were a student doing the task right then. She said, "There are several good ways to do this." I replied, "That's good, let's take the best way first." Then we started.

Consultant: What do you do first?

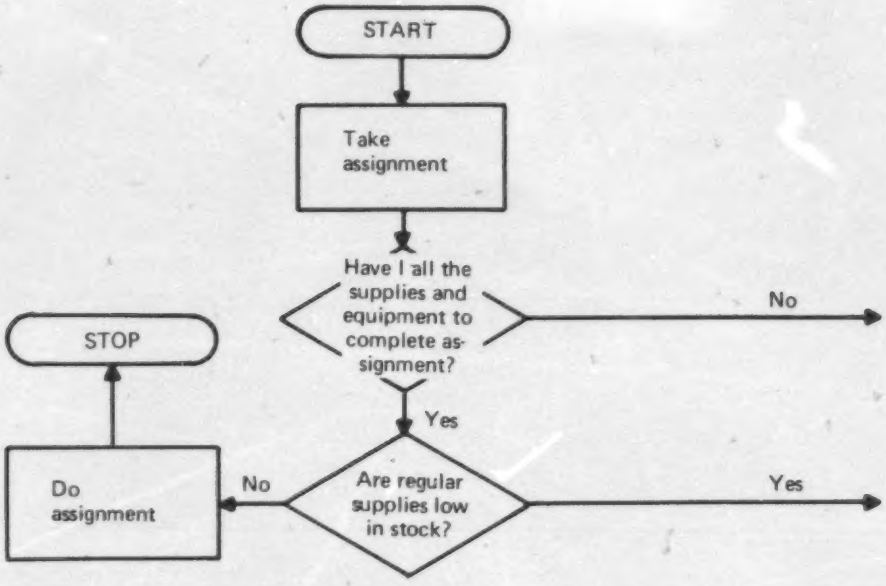
Supervisor: I decide what I need and how much money I have.

C: How do you decide what you need?

S: Well, when I'm given an assignment and I don't have what I need in the office to do it, I have to order it.

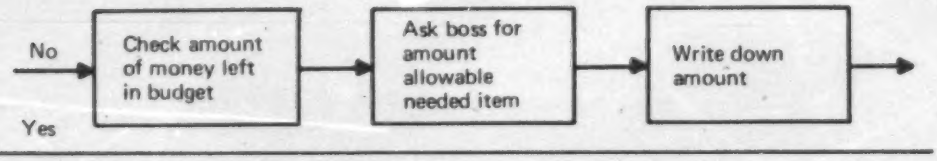
C: Any other time?

S: Yes, when regular supplies are running low.



C: How do you know how much money you have?

S: First, I check the books and see how much money is left in that category and then I ask the boss how much out of that I can spend for what I need.

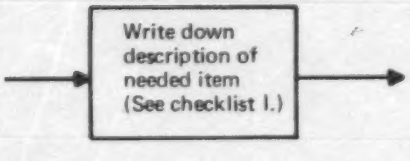


C: What do you do next?

S: I jot down a description of what I need.

C: What does that include?

S: The item name, its function, the quantity, its durability, physical description, the maximum amount it can cost and when I want it.



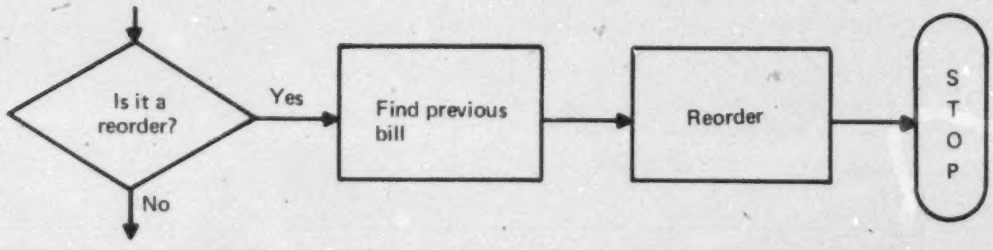
Checklist I.
Have you included:
- ☐ Item name
- ☐ Function
- ☐ Durability
- ☐ Physical description
- ☐ Quantity
- ☐ Maximum cost
- ☐ Delivery time – All yes, proceed on.

C: O.K., next?

S: I have to find out where I can get it.

C: How do you do that?

S: That depends on whether it is a reorder or not. If it is a reorder I look up the old bill and reorder.



C: If it's a new order?

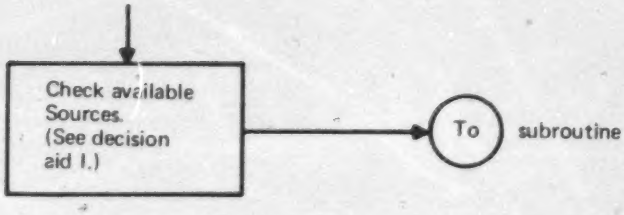
S: That depends on what sources are available.

C: What are the usual choices of sources?

S: Catalogues, the yellow pages, other secretaries.

C: Is that the order of priority you usually give them?

S: Yes



Decision Aid I.

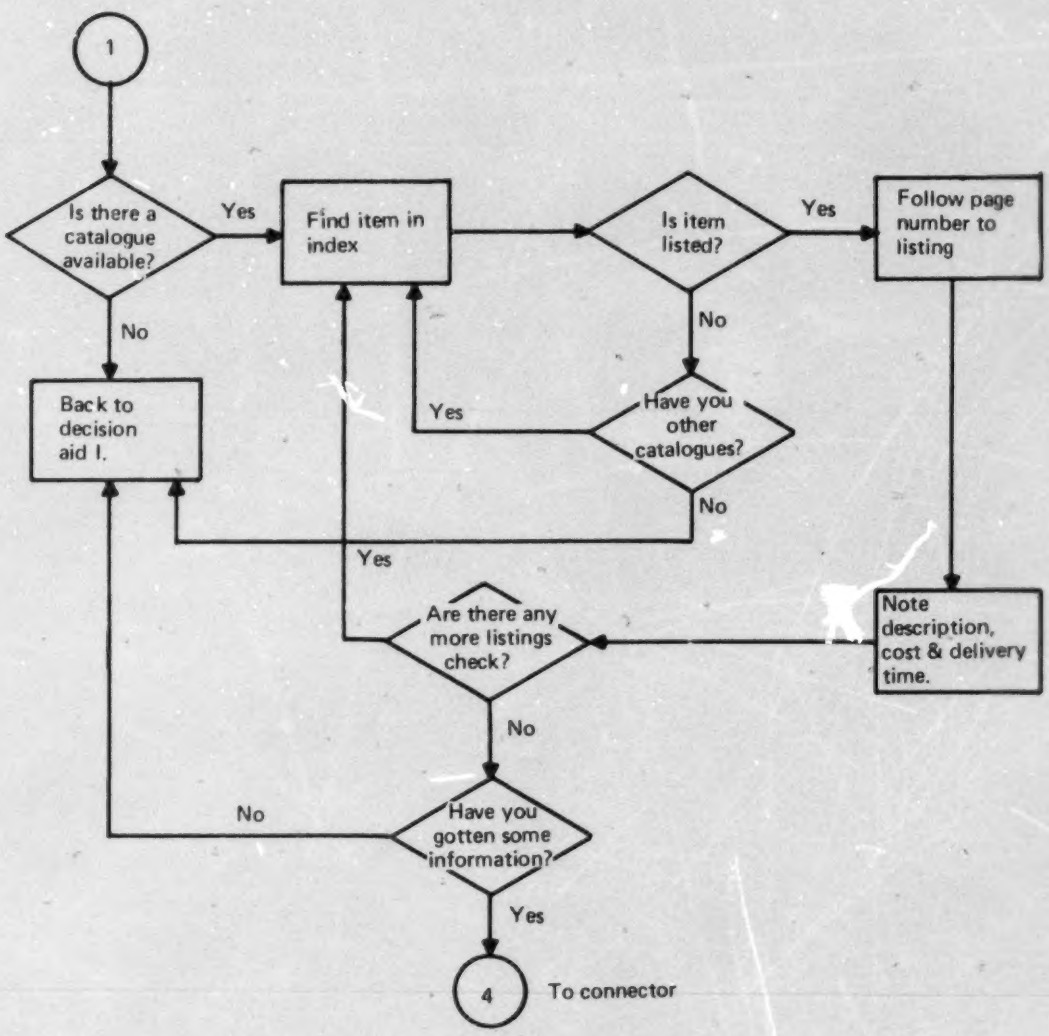
Priorities	Source	Action
1	Catalogue	Proceed through subroutine 1
2	Yellow pages	Proceed through subroutine 2
3	Other secretaries	Proceed through subroutine 3

C: Let's take them one at a time. How do you use the catalogue?

S: Well, first I check to see if there are any catalogues in which I would be likely to find this item. Then I look up the item name in the index. Then I follow the page number and find the listing in the catalogue.

C: Is that all?

S: No, I take notes on the description given the cost and which catalogue it was in and its delivery time.

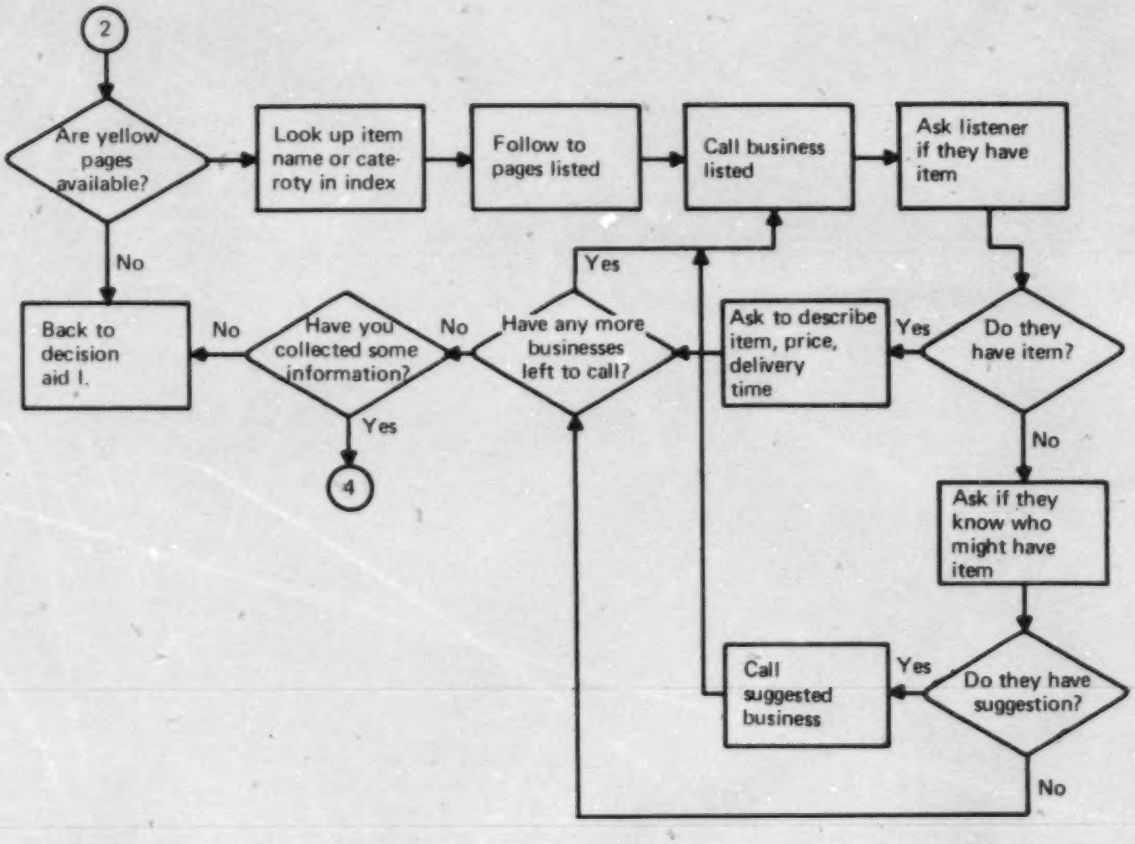


C: How about the yellow pages?

S: In the yellow pages, I look up the item name or category in which the item might fall in the index and then I follow it to the pages listed. I check each business by calling and asking if they have the item. If they do, I ask them to describe it, give me its price and the delivery time.

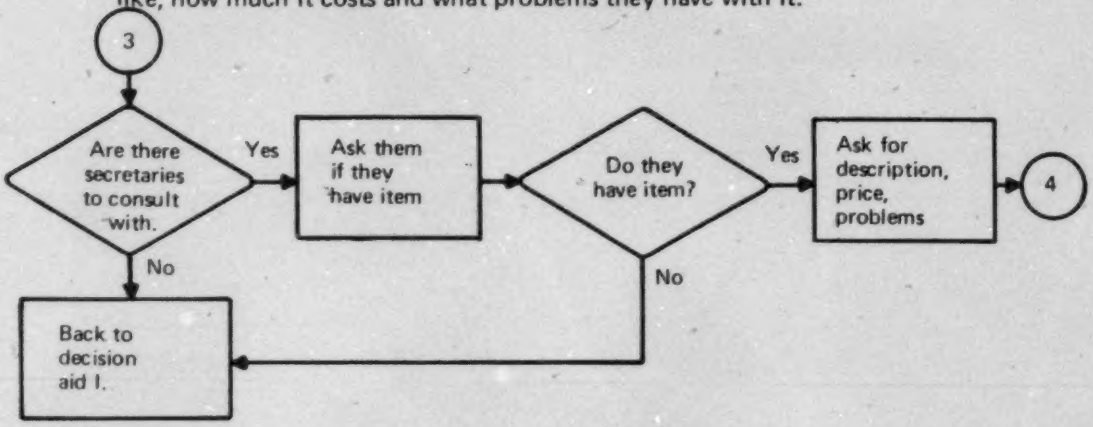
C: What if they don't have the item?

S: Then I ask if they know anyone who might be likely to have it. If they suggest someone, I call them and ask them the same things.



C: What do you do with the source – other secretaries?

S: I ask them if they have the stuff in their office. If they do, I ask them what it's like, how much it costs and what problems they have with it.



C: Have you covered all the sorces?

S: Yes, I think so.

C: What if none of these sources yielded information, what would you do?

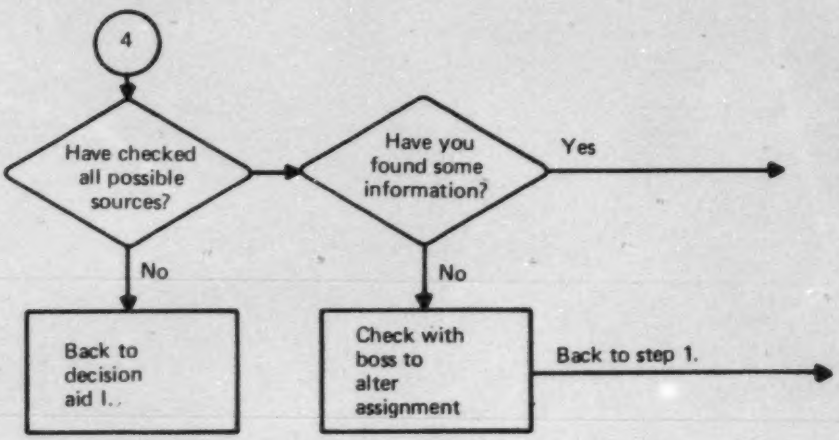
S: I don't know.

C: Let me see, has that ever happened?

S: No

C: What if it did and you had no information?

S: I would check with my boss to see if the assignment might be altered.



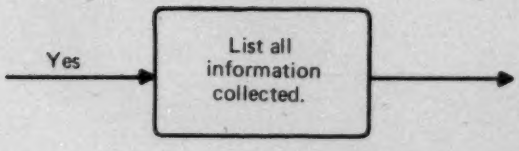
C: O.K. Let's get back to all the information you collected. What do you do with it?

S: I list the items, the prices and the descriptions and then I pick the best one.

C: How do you pick the best one?

S: I just do . . . you know!

C: I know and you know, but to communicate to students we have to specify what is done here.

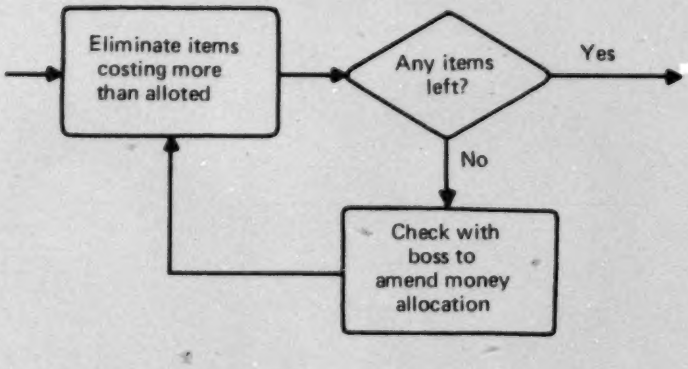


S: Oh, well, I know I get rid of those that cost too much.

C: What would happen if they all exceeded the price set by your boss?

S: I guess I would have to check with him.

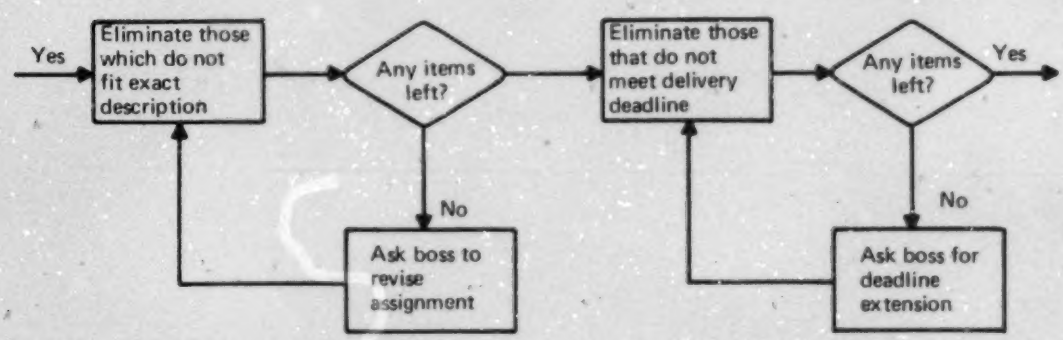
C: O.K.



S: Then I eliminate those that don't fit the exact description of what we want and from what I have left I make the choice. If all are eliminated perhaps the boss could change the assignment.

C: How do you make the final choice?

S: I forgot, before I make the final choice I eliminate those choices that can't get the item to me within my time deadline. If that cuts them all out I'd ask the boss to extend the deadline.



C: O.K., now how do you make the final choice?

S: That depends . . .

C: On what?

S: On whether the choices are all the same quality or not.

C: What if they are the same quality?

S: I pick the cheapest one and order that.

C: And what if the quality varies?

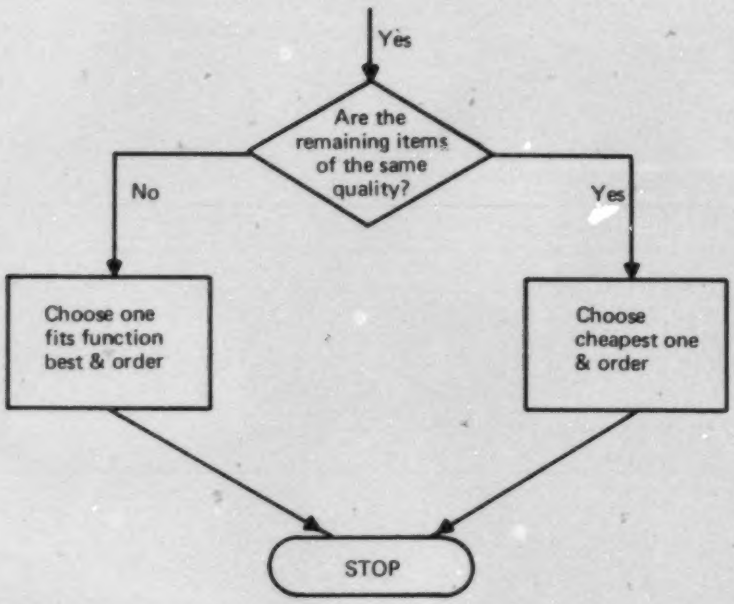
S: I pick the one that fits the function best and order that, ingoring the cost.

C: Now you're almost done.

S: What do you mean?

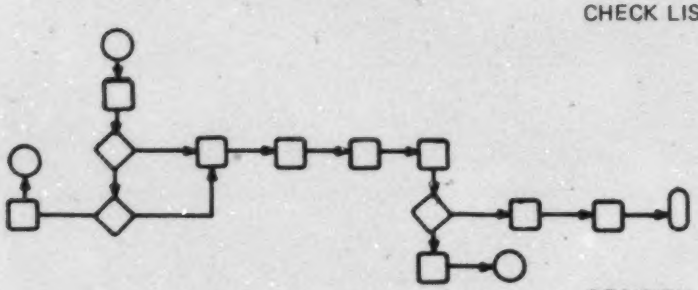
C: Now we will test the task description out by giving it to a student as a set of instructions and see if she can do the task without error.

S: O.K., let's go.

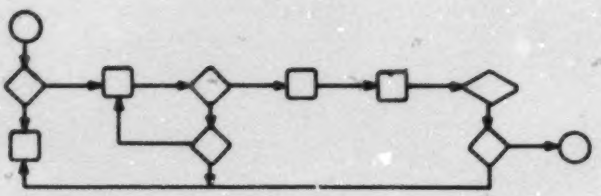


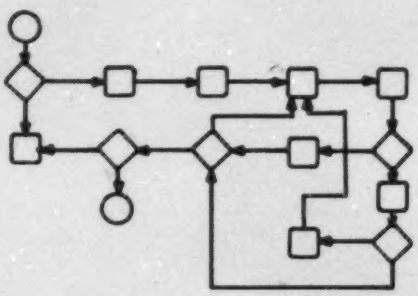
These miniaturized diagrams are to give a total view of the task put together. Each would be put together on its own page.

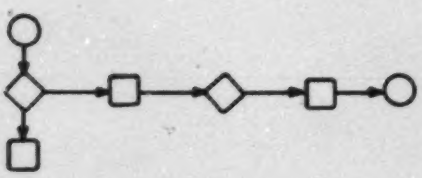
CHECK LIST

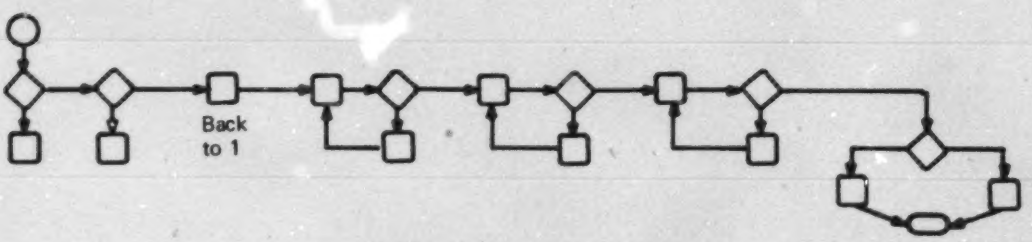


DECISION AID I

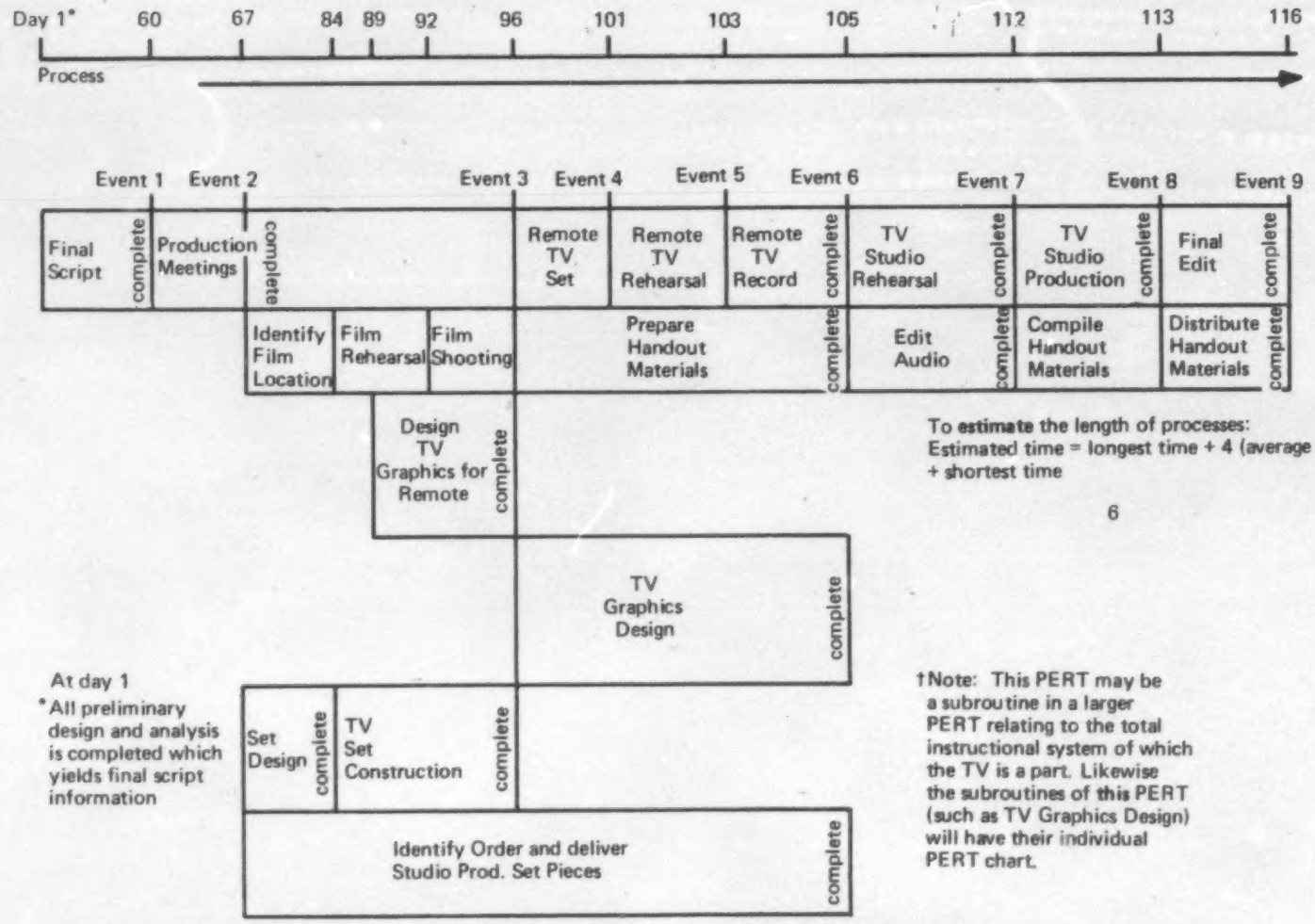








APPENDIX 9 A Pert Chart for an ITV Production†



To estimate the length of processes:
Estimated time = longest time + 4 (average time) + shortest time

6

At day 1
*All preliminary design and analysis is completed which yields final script information

†Note: This PERT may be a subroutine in a larger PERT relating to the total instructional system of which the TV is a part. Likewise the subroutines of this PERT (such as TV Graphics Design) will have their individual PERT chart.

APPENDIX 10 Major Steps in Instructional Development as Outlined in the Systems Approach

1. Identify key personnel at each level in the school system and suprasystem including:

   a. Teaching Staff
   b. Specialists
   c. Administrative and support staff
   d. School Board
   e. Community

   These individuals should be respected **opinion leaders** who are favorably disposed to the idea of change, although they may be in disagreement as to the direction of change.

2. Organize a representative group of the opinion leaders into a committee who will become the nucleus of the **steering** management function.

3. Begin tentative problem identification. Involve everyone, at least indirectly.

4. Define systems and subsystems (Appendix 1) so as to point up possible problem locations.

5. Identify **functional** relationships among the systems.

6. Identify the **human factors** present within the various systems (Appendix 2).

7. After identifying the apparent problem areas and/or relationships, make a specific statement as to a definition of the status quo as compared with a preliminary **ideal.**

8. Begin analysis of the setting with the expectation that there may be (ought to be) changes in everyone's perception of the status quo and the ideal as more information becomes available.

9. Expand the steering committee to serve the **design** function within which the analysis of the setting is logically included.

10. Conduct an analysis of the systems of interest using questions such as are outlined in Appendix 3, but do not be confined to only the questions listed, as they are not intended to be exhaustive.

11. Seek out

11. Seek out **sources** of information using suggestions which are provided in Appendix 4; again, these suggestions are not intended to be exhaustive.

12. Generate evaluation instruments such as the questionnaire (Appendix 5), but be certain that answers are not biased by any instrument, used. (Nondirective techniques may be equally useful as are "rap" sessions and private meetings.)

13. Make sure that as the analysis of the setting continues, there is a **maximum** of information exchange among **all** of the involved systems. **Expect plenty of heat** as you are deliberately encouraging the expression of feelings and opinions which may be deep seated, long held and strongly felt. At the same time, also plan to counter apathy by promoting involvement. It may seem to be convenient to permit a "copout" by some individuals, but it will hurt in the long run.

14. Based upon what you learn as you analyze the total instructional setting, construct flow charts which will help make complex relationships more easily visible (Appendix 7) and thus point out possible causes of systems dissonance. Anticipate developmental considerations as exemplified by Appendix 6.

15. Keep in mind that while a formal table of organization may show one kind of relationship among certain systems, the actual flow of information (and influence) may be something quite different.

16. Begin to juggle system relationships based upon the analytical techniques presented in Appendix 8. An "Ideal" should begin to emerge based upon the information gathered and the analysis undertaken. Be **certain** that there is a free flow of information among all relevant systems during this critical stage.

17. Expand the design committee to include the **development** function. (Appendix 6).

18. The need for certain specific changes in the **status quo**, in order to meet the requirements of the agreed upon ideal, ought to be apparent. Use PERT charts to make visible the critical events as connected by the time-line processes which lead to and connect the events. (Appendix 9).

19. Begin development and evaluation of specific instructional settings by first identifying specific instructional objectives consistent with the newly emerged ideal. (**Objectives** are studied during Stage II – DEVELOPMENT of the Instructional Development Model.) Anticipate the considerations which will arise attendant to the **operating** management function.

20. Avoid becoming locked into the above sequence of suggested steps. Be **flexible** and respond to information presented in the environment. The real power of the systems approach lies in the imagination, ability and integrity of those who participate in it.

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*Indicates appropriate materials for initial reading. "Buckley" is the prime resource for an anthology of general systems theory basic readings. "Farber" is the best single resource for a first reading in basic communication theory. "Watzlawick" provides a model for analyzing dyadic communications from the perspective of a transactional analysis. "Ardrey" and "Lorenz" provide insight to an important development in the interpretation of human behavior; namely, that there are certain biological releasers which are keys to behavior that have heretofore been overlooked or underemphasized by most theoreticians who analyze human behavior.

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